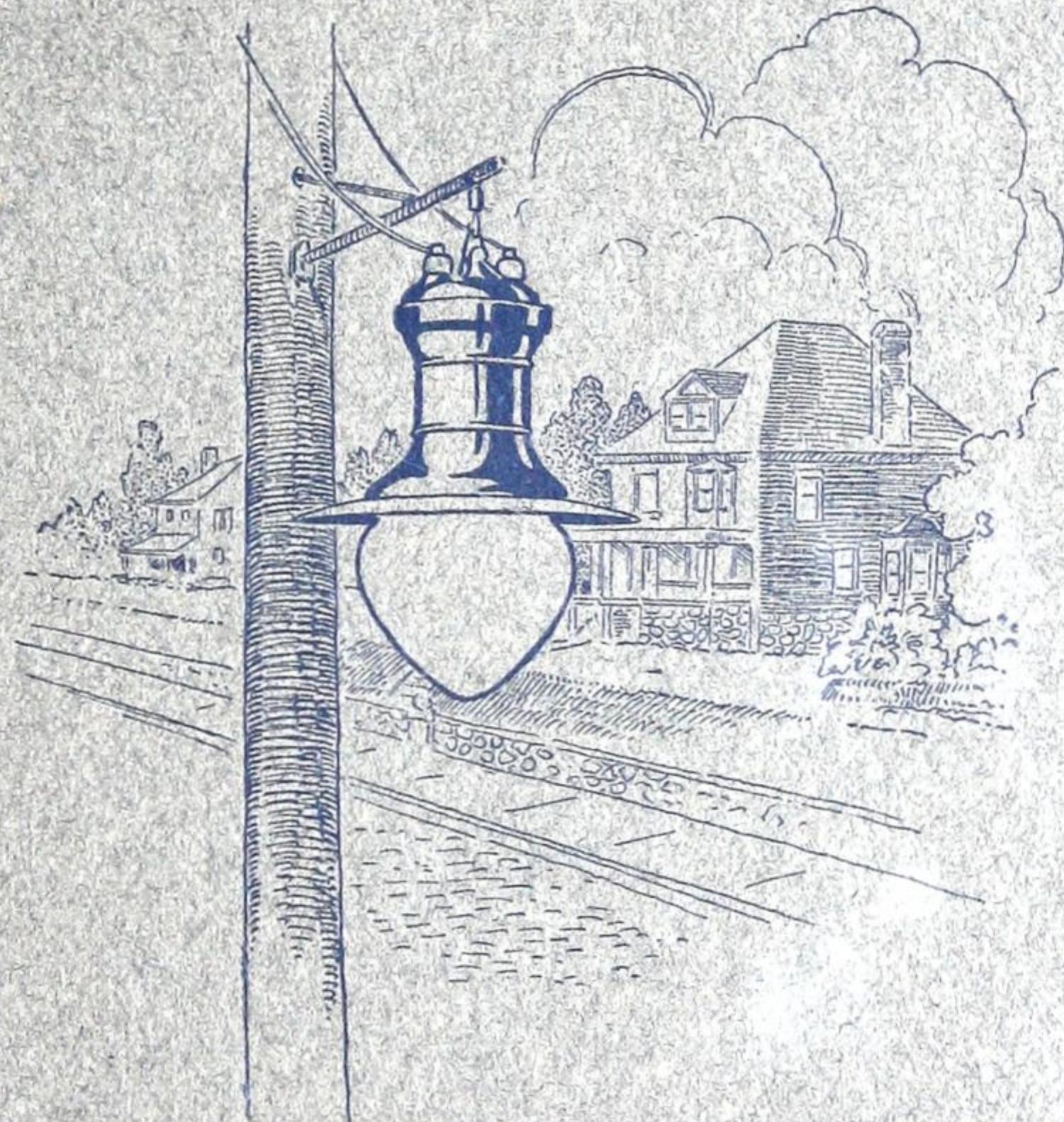


281-4.

# Westinghouse Arc Lamps and Lighting Systems



Catalogue 7-A

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CCA

# Westinghouse Arc Lamps and Lighting Systems

**Catalogue 7-A**  
December, 1916

Supersedes Division 7 of Catalogue 3001



**Westinghouse Electric & Manufacturing Company**  
East Pittsburgh, Pa.

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## INTRODUCTION

The Westinghouse Supply Catalogues present a list of supply apparatus manufactured by this company. At the present time the following catalogues are issued or in course of preparation.

Cat.	Subject
1-A	Lightning Arresters
1-B	Circuit-Breakers, Switches and Fuses*
2-A	Switchboards*
2-B	Switchboard Accessories*
3-A	Watthour Meters
3-B	Instruments and Relays
4-A	Distributing Transformers
4-B	Feeder-Voltage Regulators and Transformer Apparatus
5-A	Insulation and Supplies
5-B	Railway Accessories*
6-A	Line Material*
7-A	Arc Lamps and Lighting Systems
7-B	Battery Charging Rectifiers*
8-A	Electric Fans
8-B	Railway Coach Fans
8-C	Heating Appliances
8-D	Electric Ranges

Any of these catalogues will be sent upon request.

**Style Numbers**—To facilitate ordering and the classification of records, each piece of standard apparatus built by this Company has a style number, which, with the description of the apparatus, should be stated in ordering. Each style number designates a definite piece of apparatus as listed. When any slight modification is desired, the apparatus should be ordered as: "Style No. .... except (state modification desired)."

**Weights**—The weights given in this catalogue are approximate, and are given to enable the calculation of freight charges.

**Dimensions**—The dimensions given in this catalogue are for reference only. For official dimensions apply to the nearest district office.

**Prices** in this catalogue are those in force at the time of issue and are subject to change without notice—when they are used as a quotation, it must

be with this understanding. Prices are f.o.b. point of shipment unless otherwise specifically stated.

**Terms** are such as Company may extend to purchaser, not to exceed net cash thirty (30) days from date of shipment.

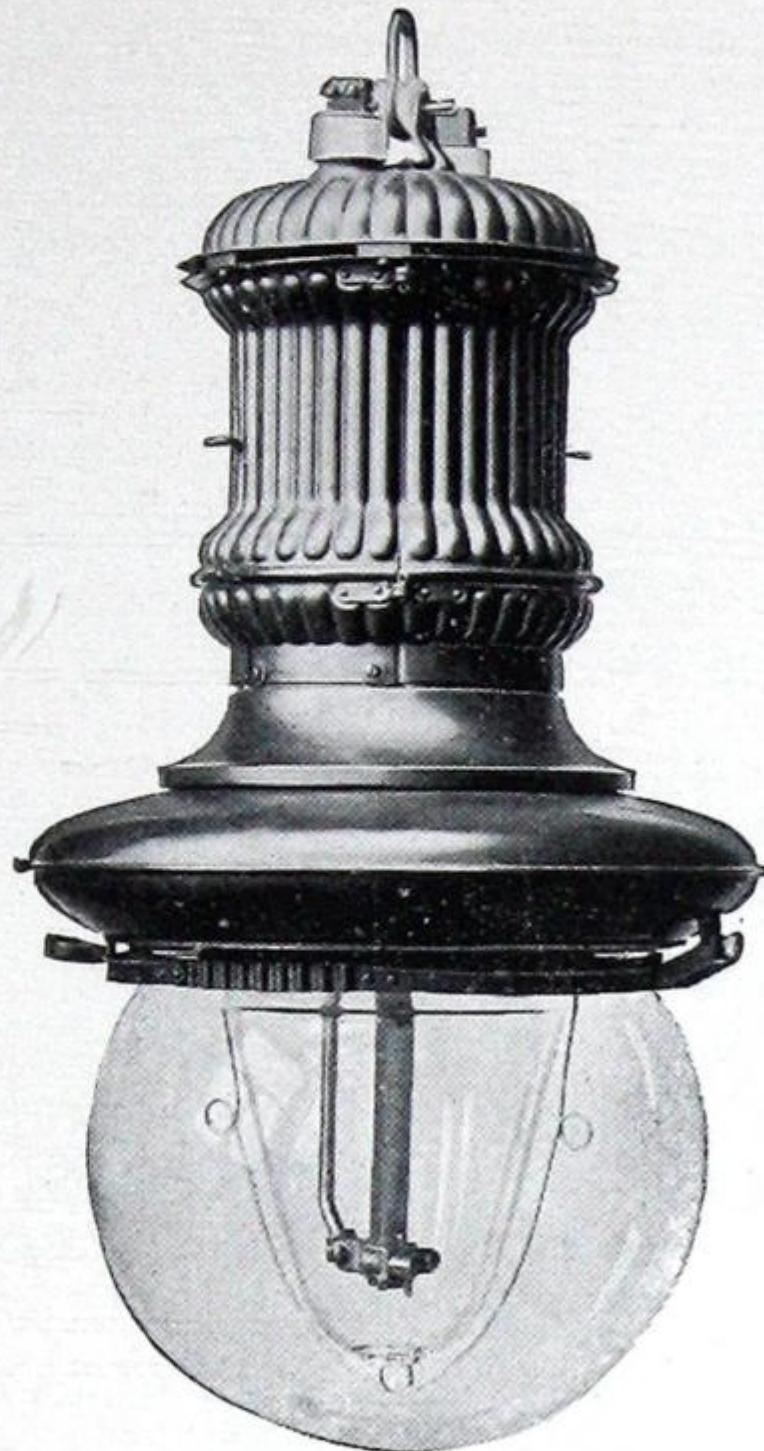
### Notice to Purchasers

Delays and misunderstandings will be avoided if customers will note carefully the following points:

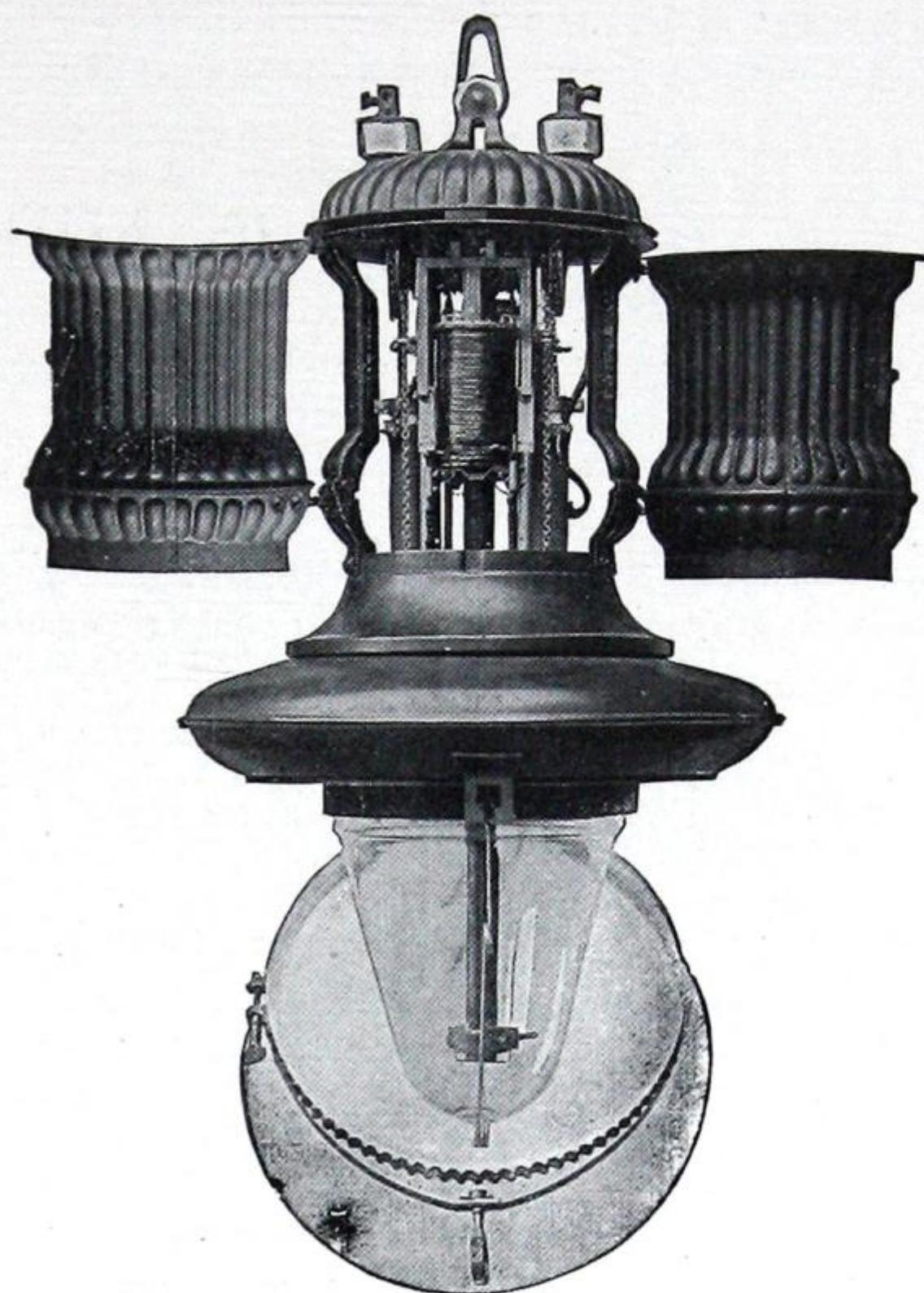
1. Send all correspondence and orders to the nearest office (see list on last page).
2. Order by style number and give complete description. Do not say "same as last order."
3. In ordering duplicates of apparatus not listed, order by the style number or stock order (S. O.) number. One of these numbers is cast or marked on the apparatus. The serial number and a full description of the apparatus should also be given.
4. When referring to an order, always mention the number and date of your order and the name of the consignee.
5. State whether shipment is to be made by freight or express, and name the route, or by parcel post. In the absence of instructions, shipment will be made by the cheapest route. Shipments ordered by parcel post will be insured on request. All shipments will be at purchaser's risk.
6. Present all claims for breakage to the transportation companies, as we make no allowance for breakage after delivery in good order to carriers.
7. Make claims for shortage within five days after receipt of shipment; otherwise they will not be entertained.
8. Do not return goods without first obtaining written approval, with shipping directions, from the office through which order was placed.
9. Send proper notification of shipment of returned material, with copy of shipping receipt, to the district office. Such material must be marked plainly with the name and address of the sender; otherwise we cannot accept responsibility for credit.

\*Not issued at date of this catalogue.

## TYPE H FLAME CARBON ARC LAMPS—(DS720)



D.C. MULTIPLE LAMPS (SERIES LAMPS ARE SIMILAR IN APPEARANCE)



### Applications

For factories, warehouses, mills, and other large industrial plants where the intensity of illumination should be uniform over the working surface, as well as for street, park, and boulevard lighting, these lamps give excellent and efficient illumination. Their exceptionally substantial construction and wide light distribution make them the best lamps to use in outdoor construction work, in quarries, in railroad yards, etc. Their intense illumination at low cost also makes them very desirable for display lighting in front of stores or theatres, or for the lighting of public squares.

Equipped with yellow-light carbons, which can be furnished instead of white-light carbons without additional cost, the lamps produce a light of great intensity and high penetrating power for the smoky and dusty interiors of foundries, train sheds, steel mills, and similar places. For marine work, on docks, etc., this yellow light is particularly desirable to penetrate fogs.

### Distinctive Features

Remarkably uniform and shadowless illumination.  
Reliable and steady operation.

Complete isolation of the mechanical parts from the heat and fumes of the arc.

Very substantial construction throughout.

Insect-proof and weatherproof case.

Very simple mechanism, easy to inspect and adjust.

The carbons are arranged vertically, producing maximum candle-power close to the horizontal plane,

which adapts them for lighting large areas. Special globes to modify the light distribution are available if desired. A very steady arc and an even burning of carbons is obtained by having all magnetic fields compensated. The illumination produced is remarkably uniform and shadowless.

**Cycle of Operation**—Whenever the clutch is released the carbons feed together by gravity, their relative motion being controlled by a chain wheel pivoted eccentrically on a rocker arm. In burning, the series coil allows the rocker arm to tilt so that the carbons approach each other, maintaining the arc length constant. The clutch is released when the limit is reached, allowing gravity to bring the carbons slightly closer together; the resulting increased current strengthens the series magnet and causes the rocker arm to assume its normal position. When power is off, the carbons fall together with sufficient impact to break any slag that may have formed on their ends during operation.

In the case of series lamps a shunt coil is balanced against the series coil. The variation in voltage across the coil caused by any variation in voltage of the arc causes the shunt coil to buck the series coil in its action.

The mechanism of these lamps allows a regular and uniform feed, and is so arranged that friction is a minimum. A dashpot with a ball valve and self-lubricating graphite plunger insures exceptionally steady operation.

**Trimming**—The lamps can be readily cleaned and trimmed by simply removing the globes. Only the upper carbon is renewed when trimming; the stub

## TYPE H FLAME CARBON ARC LAMPS—(DS720)—Continued

from the upper carbon cut to proper length is used for the lower.

A cutout mounted on the rocker arm, in the **power circuit** multiple-series lamp, short-circuits the lamp when the carbons are consumed, through a substitutional resistor in the lamp case, which produces approximately the same voltage drop as that of the lamp when operating normally. By closing the circuit through the substitutional resistor, it assures that other lamps in series will operate at substantially their normal voltage. Multiple series lamps may be obtained without this feature.

A similar cutout in the series lamp maintains the series circuit and protects the lamp when the carbons are consumed.

## Construction

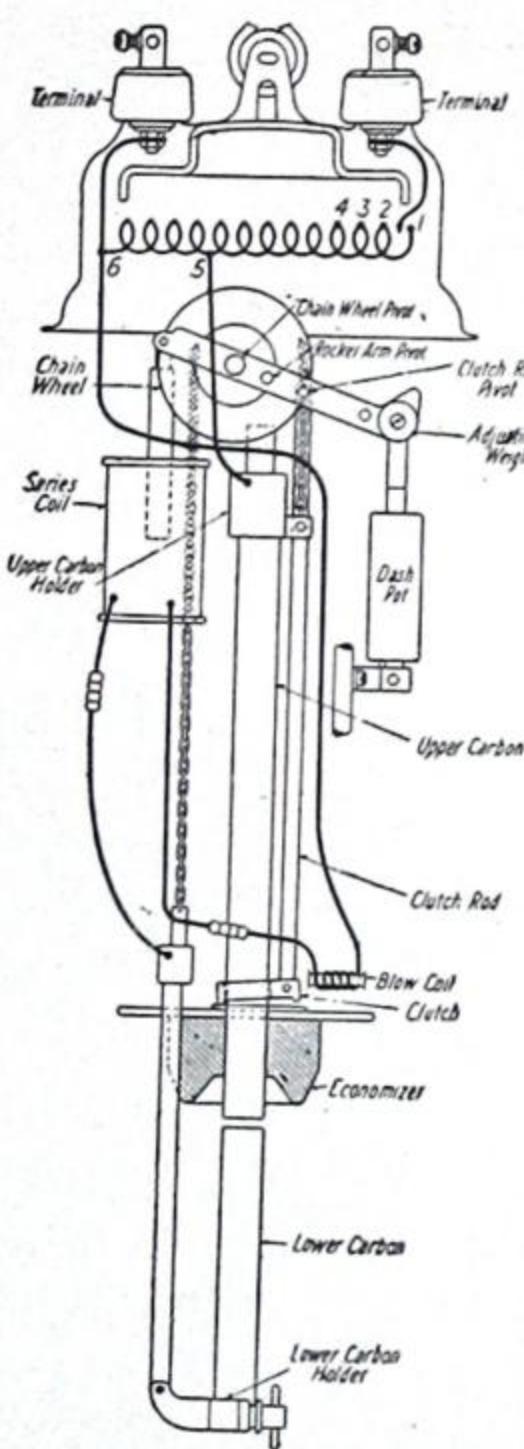


DIAGRAM OF CONNECTIONS  
A.C. MULTIPLE LAMPS  
WITH SELF-CONTAINED  
AUTO-TRANSFORMERS

The lamps are light and strong and present a graceful, symmetrical appearance. All parts have been designed for reliability in operation and long service.

**Condensing Chamber**—The lower part of the lamp shell constitutes a condensing chamber for the fumes from the arc. In operation, the fumes rise into this chamber and deposit on its cooler surfaces. The condensing chamber is separated from the mechanism chamber; thus protecting the mechanism from deposit and corrosion. The chamber can be readily cleaned out by the trimmer without removing any part but the globes.

**Economizer**—A durable, fireproof economizer is placed immediately above

the arc, to pocket the heated gases, and thus increase the light-giving efficiency and life of the carbons. It shields the lower frame plate and the mechanism chamber from the heat. This economizer becomes coated with deposits from the arc vapors and presents a white reflecting surface, increasing the light under the lamp.

**Globes**—The lamp has two globes. The inner globe is held in place by a spring bail which exerts a firm and even pressure. The globe is carefully designed to provide for proper combustion of the gases, a feature having an important bearing on the proper diffusion of light. Different designs of outer globes are available (see pages on "Arc Lamp Accessories"). Both the inner and the outer globes are available in clear, opalescent, alba, or marbo glass.

The outer globe support is a spring collar which is flexible enough to give close contact around the entire lip of the globe and to yield at the upper edge to the ordinary strains of service. This prevents breaking of the glass. Globe collars are interchangeable and adjustable and are attached to the lamp by means of a separable hinge.

**The frame** is built strongly, of metal rods which connect two metal plates that support the lamp mechanism.

**The case** is of heavy sheet copper pressed into corrugated form and finished in dull black. Two hinged doors, each occupying one-third of the periphery, make the mechanism readily accessible for adjustment. These doors fit tight and render the lamp insect-proof and weather-proof.

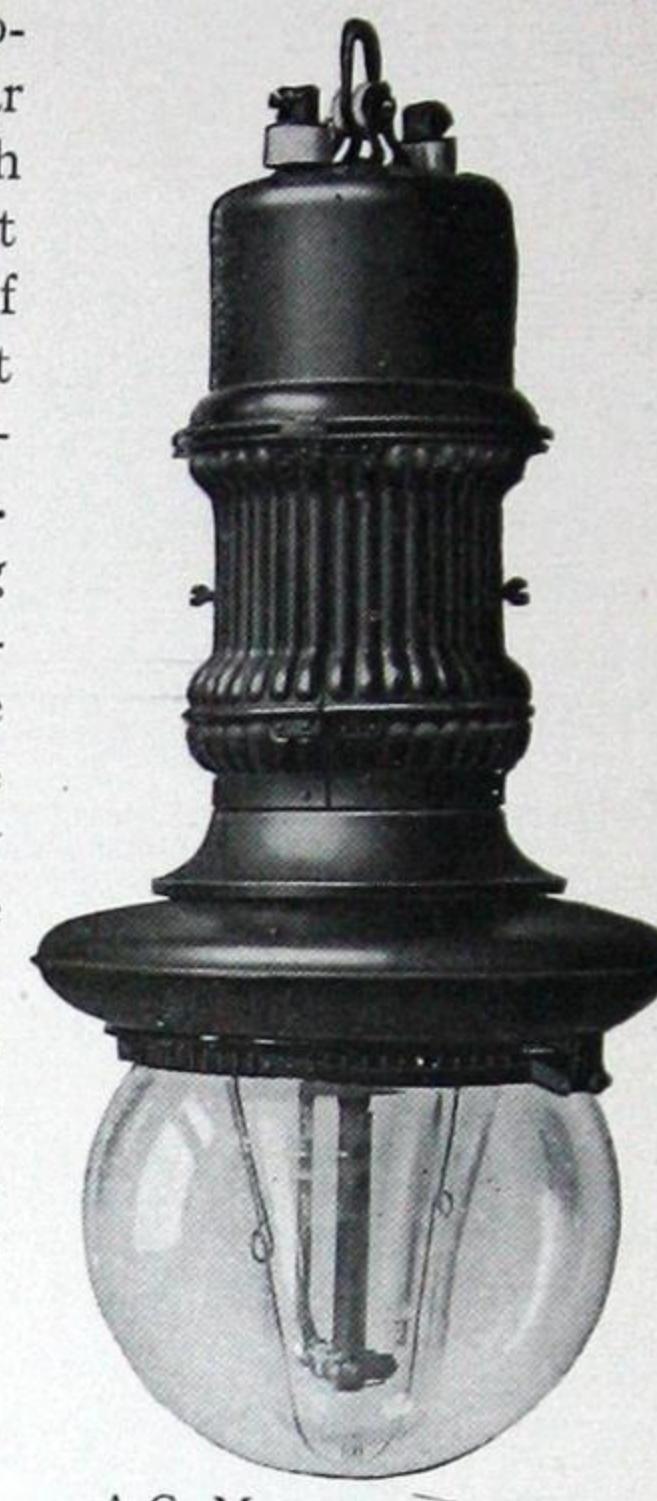
**The mechanism** is of the clutch-feed focusing type arranged to feed both carbons and to maintain the arc at all times in the position necessary to obtain the best distribution of light. Series lamps operate on the differential principle, the pull of a series magnet opposing the pull of a shunt magnet.

**The clutch** is of the well-known ring type. It is made of tempered steel to resist wear. The thickness of the ring and size of hole are such that a positive grip on the carbon is assured.

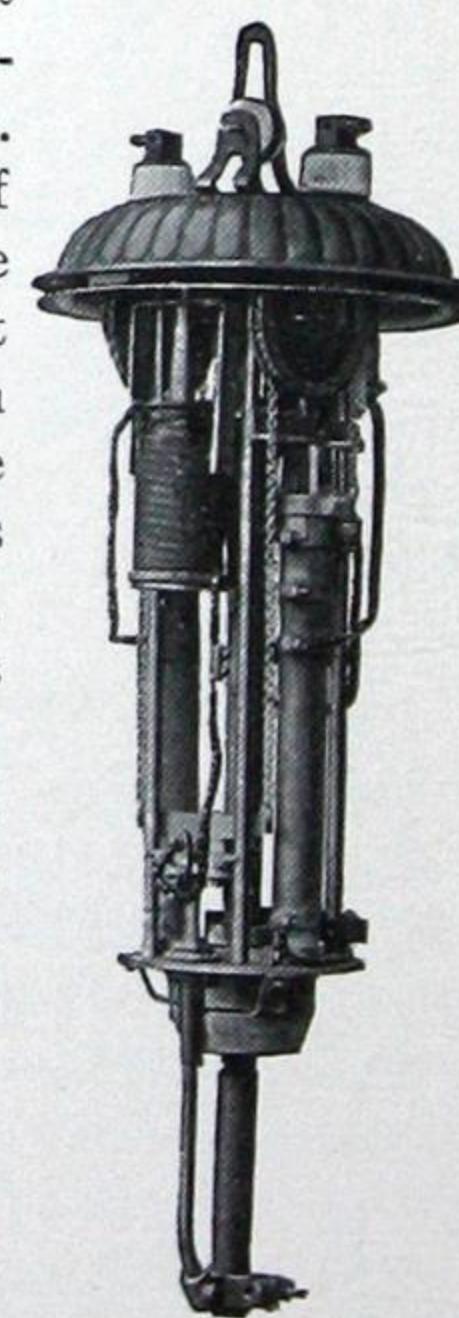
**The magnet coils** of the alternating-current lamps are wound on insulated split metal spools. This construction insures excellent ventilation, rigid coils and minimizes heating, due to losses. The magnet coils and cores of the alternating-current lamps are supported on springs to prevent the transmission of the vibration of their parts to the rest of the lamp. The wear in the lamp is thereby reduced and in addition, practically noiseless operation is obtained.

**The binding posts** are mounted solidly on the top of the lamp. They are cast of composition metal; each provided with two screws and mounted on potted porcelain insulators. Their construction prevents them from turning.

**Insulation**—Mica and porce-



A.C. MULTIPLE LAMP



MULTIPLE LAMP

## TYPE H FLAME CARBON ARC LAMPS—(DS720)—Continued

lain are used throughout for insulating purposes. Each lamp, before shipment, undergoes a 2000-volt alternating-current test for one minute.

The starting resistors of the series lamps are composed of a special wire which will not become brittle or granular, wound on porcelain tubes and coated with a durable heat-resisting insulating cement.

A stabilizing resistor, consisting of a special wire which will not become brittle or granular, is mounted in each multiple and multiple series lamp. It is wound on porcelain tubes and is coated with a durable heat-resisting insulating cement. Taps are provided to enable the lamp to be operated on voltages slightly above and below normal.

The substitutional resistor in the power-circuit lamps consists of a special metal ribbon insulated with mica and enclosed in a metal case which forms part of the lamp top.

**Carbons**—A homogeneous, impregnated carbon,  $\frac{1}{8}$  by 14 inches, is used in these lamps. An average life of approximately 130 hours per trim is obtained.

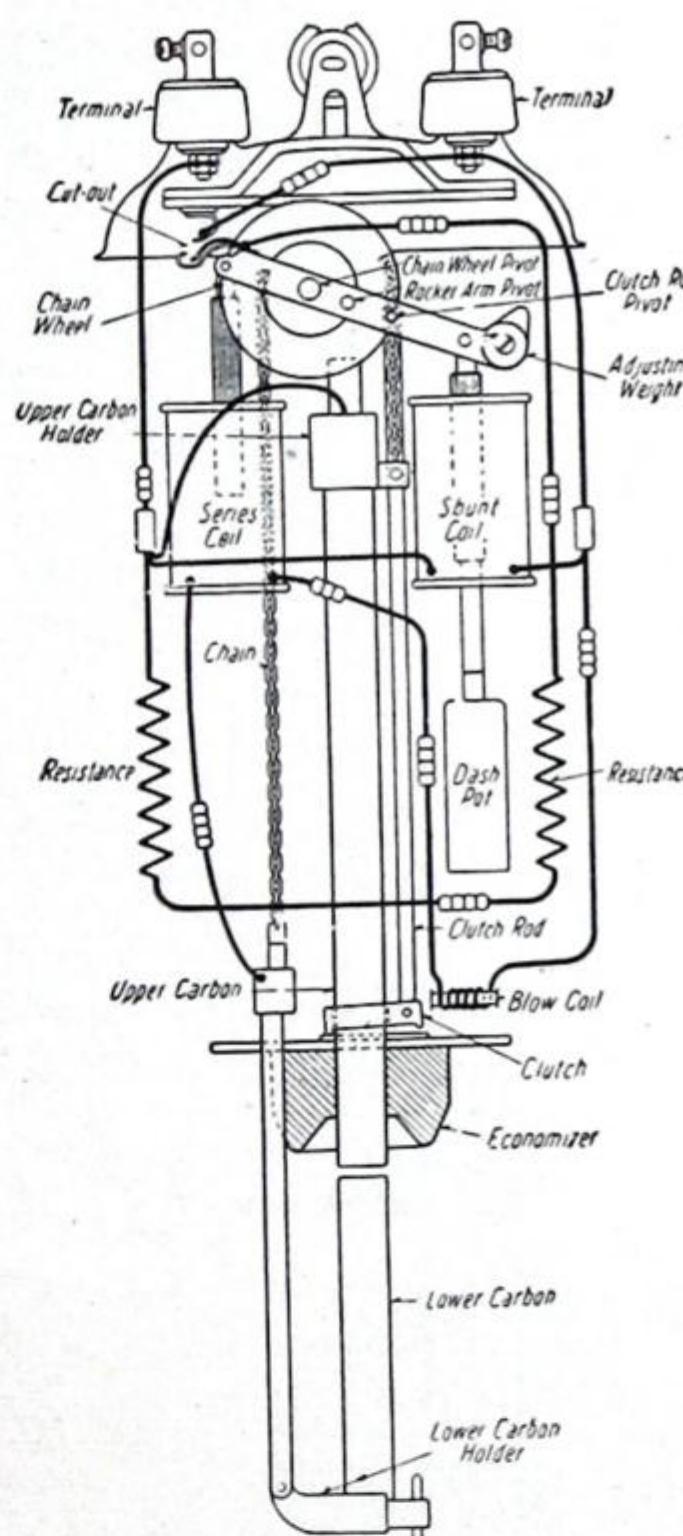


DIAGRAM OF CONNECTIONS  
A.C. SERIES LAMP

**Industrial reflectors**—The type H flame carbon arc lamps are adapted for industrial requirements by the use of special steel reflectors which give a concentrating distribution of light. The lamp is used without an outer globe, being intended for interior use only, and the reflector may be readily attached to

standard lamps by fastening to the globe seat ring the accessories necessary, consisting of a few spacing screws and washers.



D.C. POWER-CIRCUIT MULTIPLE-SERIES LAMP  
WITH INDUSTRIAL REFLECTOR

The shape of this reflector is such that all light above the 30-degree angle is incident on its reflecting surface and is redirected downward. A concentration of the total light is thereby obtained, and the light intensity on the illuminated area is much greater than that of the same area when lighted by a lamp not equipped with reflectors. The diffusion of light is increased and the maximum strength with minimum material is attained by corrugating the reflector.

The reflector is of sheet steel and its inner reflecting surface is enameled with a durable white porcelain enamel. The outer surface is enameled with a black enamel.

An auto-transformer is regularly enclosed in the lamp case to provide the proper voltage at the arc. Each auto-transformer has taps so that the lamp can be adjusted for use on circuit voltages differing slightly from normal.

For use on frequencies and voltages other than those commonly listed, a lamp can be supplied upon special order, to be used with an externally-mounted auto-transformer adapted to the circuit. Externally mounted auto-transformers can be supplied upon special order to operate with this lamp on any desired frequency between 25 and 133 cycles and any voltage between 100 and 500. The externally-mounted auto-transformers are entirely weather-proof.

## TYPE H FLAME CARBON ARC LAMPS—(DS720)—Continued

## PERFORMANCE

**A.C. series lamps**—When the standard lamp is adjusted for 10 amperes and 53 volts at terminals, the approximate performance on a 60-cycle circuit will be as follows:

Arc voltage.....	47.5
Lamp power factor.....	84%
Lamp watts.....	445
Electrical efficiency of lamp.....	91%

**A.C. multiple lamps**—When adjusted for 10 amperes and 48 volts at the arc, the approximate performance of the 110-volt, 60-cycle standard lamp operated on a 110-volt circuit will be as follows:

Lamp power factor.....	60.5%
Lamp watts.....	500
Electrical efficiency.....	86%

Performance of lamps of other ratings will be furnished on application.

**Operation on other circuits**—Standard 10-ampere lamps may be operated on series circuits of lower current value by using an auto-transformer with each lamp. The transformer may be placed in the lamp or mounted separately. The externally mounted transformer is entirely weather-proof and is arranged for mounting directly above the lamp. In case the secondary accidentally open-circuits, the auto-transformer will operate continuously without injury to the windings.

**D.C. lamps**—Performance is given in table of style numbers and price list.

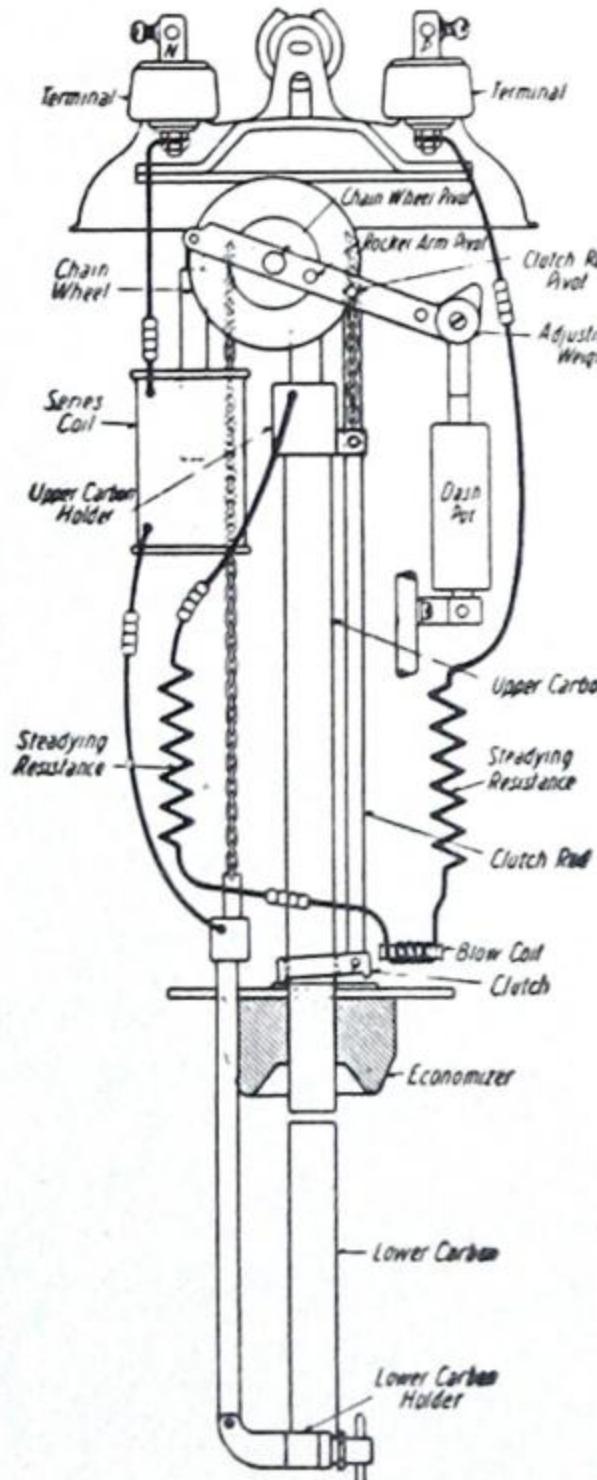


DIAGRAM OF CONNECTIONS  
MULTIPLE LAMP

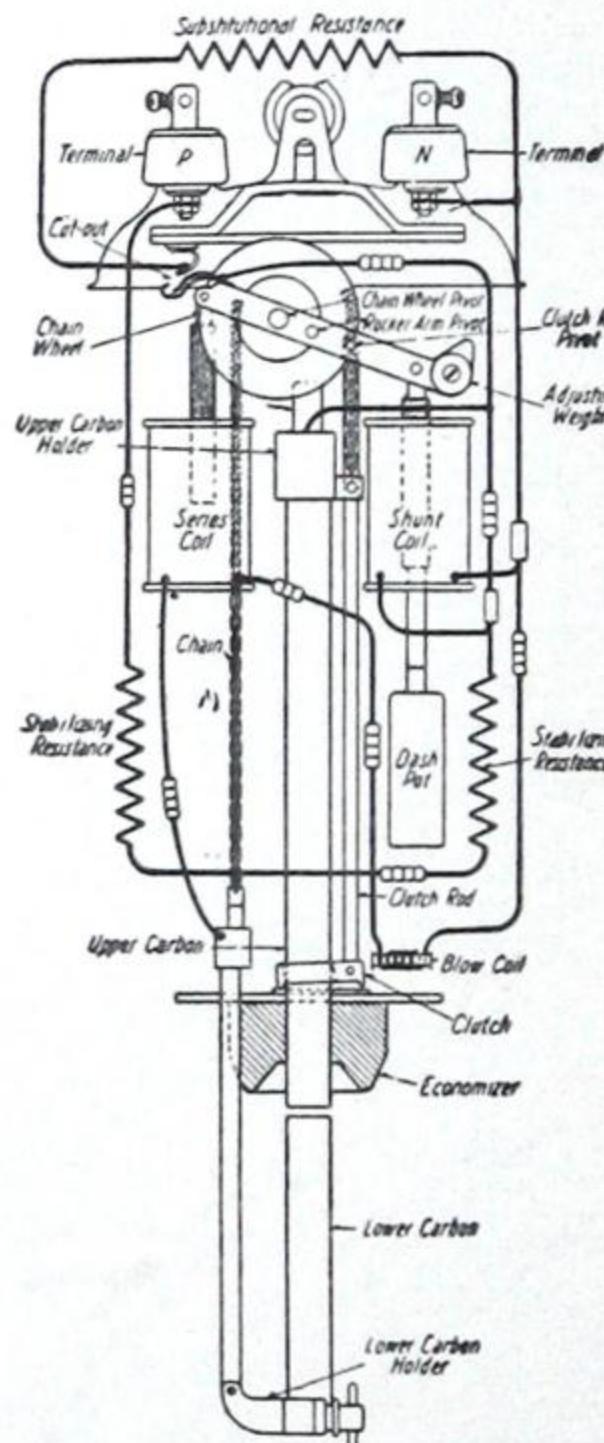


DIAGRAM OF CONNECTIONS  
POWER-CIRCUIT MULTIPLE-  
SERIES LAMP

## TYPE H FLAME CARBON ARC LAMPS—(DS720)—Continued

## A.C. Series Lamps

Style number includes lamp complete with one set of carbons and glassware. In ordering, state whether white-light or yellow-light carbons are desired, and also the kind of glassware wanted. Also indicate voltage variation; i. e., maximum and minimum circuit voltage.

Style No.	Frequency	Current	Amperes	Fig. No.	Dimension	APPROX. Wt., Lb.	List Price
	Cycles	Amperes	At Arc		A, Inches	Net, With Glassware	
217636	60	10*	9.5	1	31 $\frac{3}{4}$	53	96
219431	60	6.6 or 7.5†	10	1	36 $\frac{1}{2}$	68	120
221089	50	10	9.5	1	35 $\frac{1}{2}$	68	120
221088	25	10	9.5	1	38	78	133

\*The external auto-transformer listed below can be supplied for use with this lamp on 6.6 or 7.5-ampere circuits.

†Auto-transformers are contained in these lamps.

Information on lamps for other frequencies will be furnished on request.

## Auto-Current Transformers for A.C. Series Lamps

Style number covers auto-transformer with taps for operating one 10-ampere lamp on either a 6.6 or a 7.5-ampere, 60-cycle circuit.

Style No.	Frequency	Current	Amps.	Fig. No.	Net	Shipping	List
	Cycle	Amps.	at Arc		Weight	Weight	Price
107516	60	6.6 or 7.5	10	2	14	30	On Request

## A.C. Multiple Lamps

Style No.	Frequency	Normal	Range of	Amps.	Approx.	Dimension	APPROX. Wt., Lb.	List Price
	Cycles	Terminal	Adjustment		Terminals		Net With Glassware	
219430	60	110	100 to 125	10	7 to 7.5	3	36 $\frac{1}{2}$	65 125
217637	60	220	200 to 250	10	3.5 to 4	3	36 $\frac{1}{2}$	70 132
217638	50	110	100 to 125	10	7 to 7.5	3	36 $\frac{1}{2}$	65 125
217639	50	220	200 to 250	10	3.5 to 4	3	36 $\frac{1}{2}$	70 132
217640	25	110	100 to 125	10	7.5 to 8	3	38	78 140

Style No.	Current	Voltage	No. of Lamps in Series	Normal Terminal Voltage Per Lamp	Approx. Arc Voltage	Fig. No.	Dimension	APPROX. Wt., Lb.	List Price
							A, Inches	Net, With Glassware	
217641	6.5	100 to 125	1	110	70	1	31 $\frac{3}{4}$	49	92

## \*D.C. Multiple-Series Lamps

221136	10	100 to 125	2	55	40	1	31 $\frac{3}{4}$	53	96
221134	6.5	200 to 250	2	110	70	1	31 $\frac{3}{4}$	53	96

On Request

## †D.C. Power-Circuit Multiple Series Lamps

221135	10	$\left\{ \begin{array}{l} 100 \text{ to } 125 \\ 200 \text{ to } 250 \\ 500 \text{ to } 600 \\ 600 \text{ to } 660 \end{array} \right. \begin{array}{l} 2 \\ 4 \\ 10 \text{ or } 11 \\ 11 \text{ or } 12 \end{array} \right\}$	55	40	1	33 $\frac{1}{8}$	54	98
221133	6.5	$\left\{ \begin{array}{l} 200 \text{ to } 250 \\ 500 \text{ to } 600 \\ 600 \text{ to } 660 \end{array} \right. \begin{array}{l} 2 \\ 5 \\ 6 \end{array} \right\}$	110	70	1	33 $\frac{1}{8}$	54	98

## Industrial Reflectors

Style No.	Description			List Price
202748	Reflector only			On Request
202749	Reflector with spacers			

\*The multiple-series lamps have no substitutional resistor and therefore cannot be used on circuits of higher voltage than listed. If one lamp in a series goes out of service, the other ceases to burn.

†The power-circuit multiple-series lamps each have a cutout and a substitutional resistor in the lamp. They can be burned any number in series provided the circuit voltage averages approximately 55 volts per lamp for the 10-ampere lamp, or 110 volt per lamp for the 6.5-ampere lamp.

## TYPE H FLAME CARBON ARC LAMPS—(DS720)—Continued

## OUTLINE DIMENSIONS

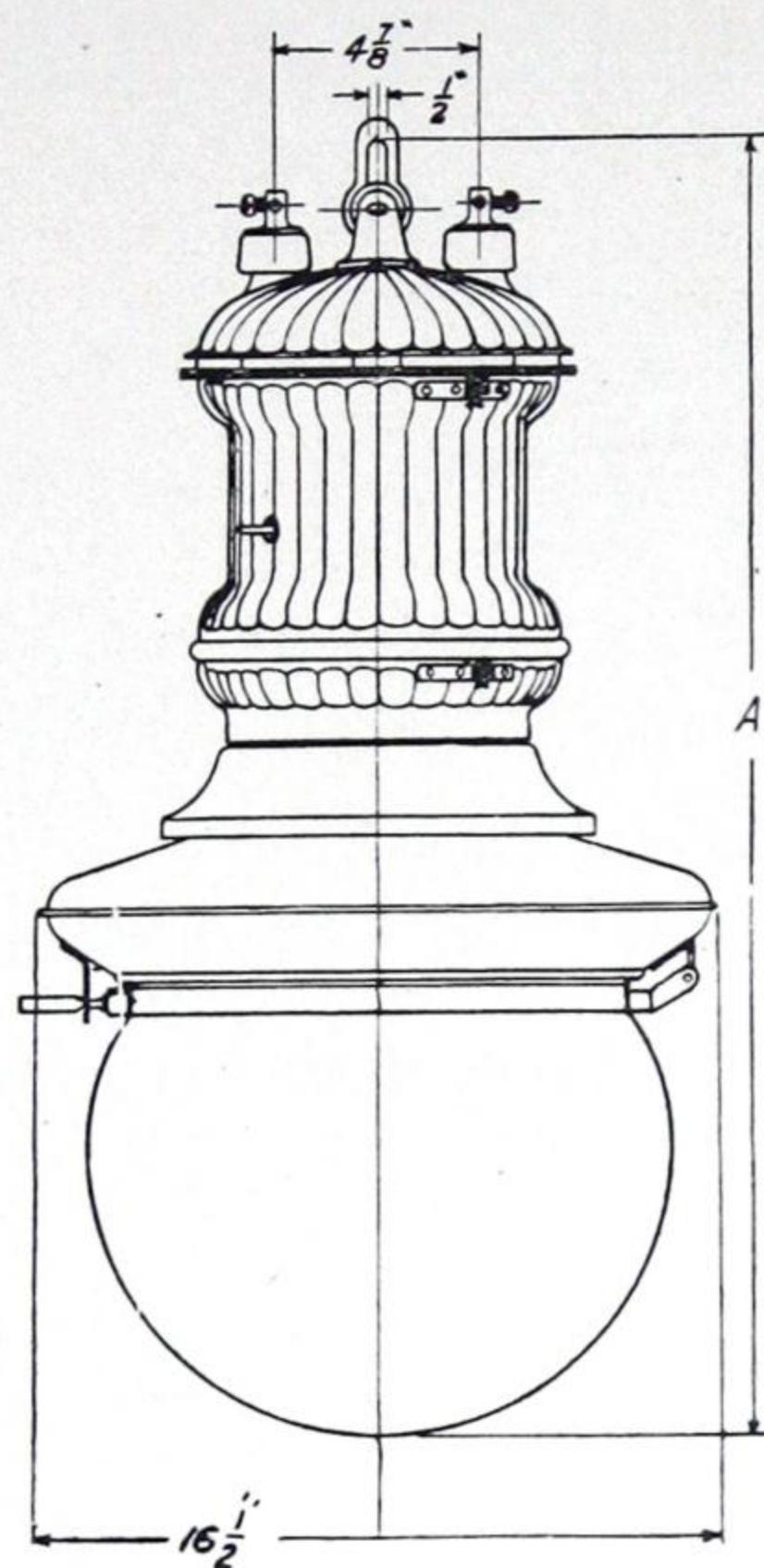


FIG. 1

A.C. SERIES LAMP

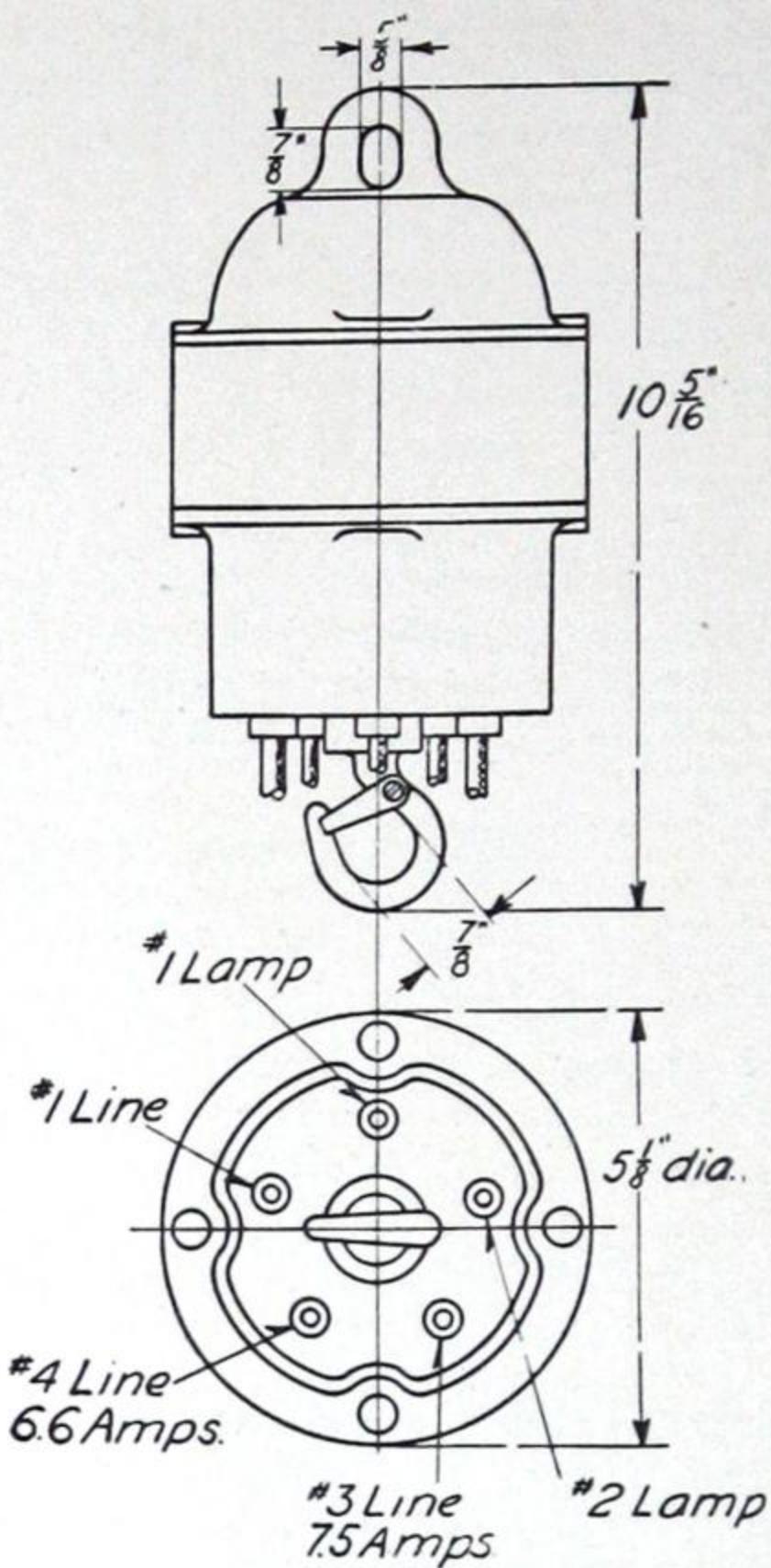


FIG. 2

AUTO-CURRENT TRANSFORMER

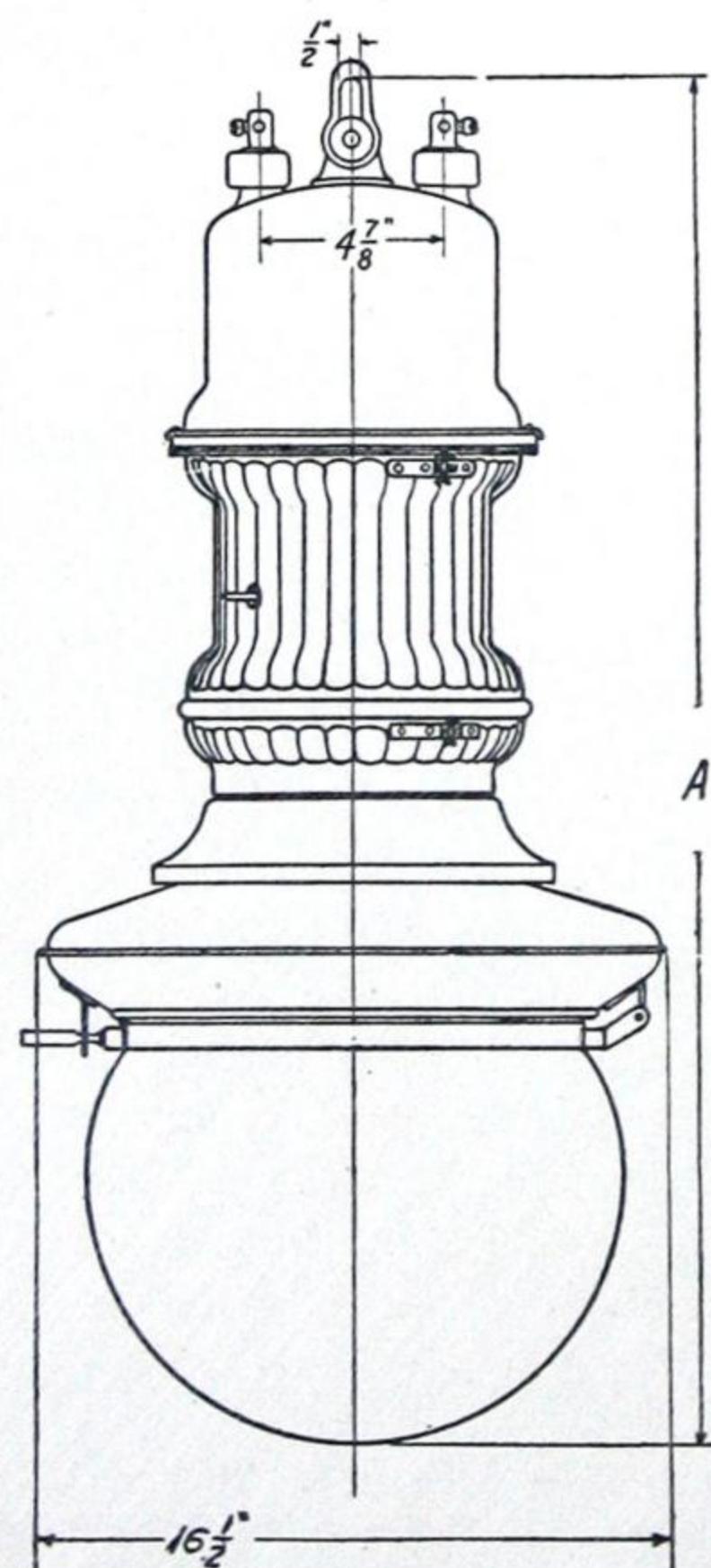


FIG. 3

A.C. MULTIPLE LAMP

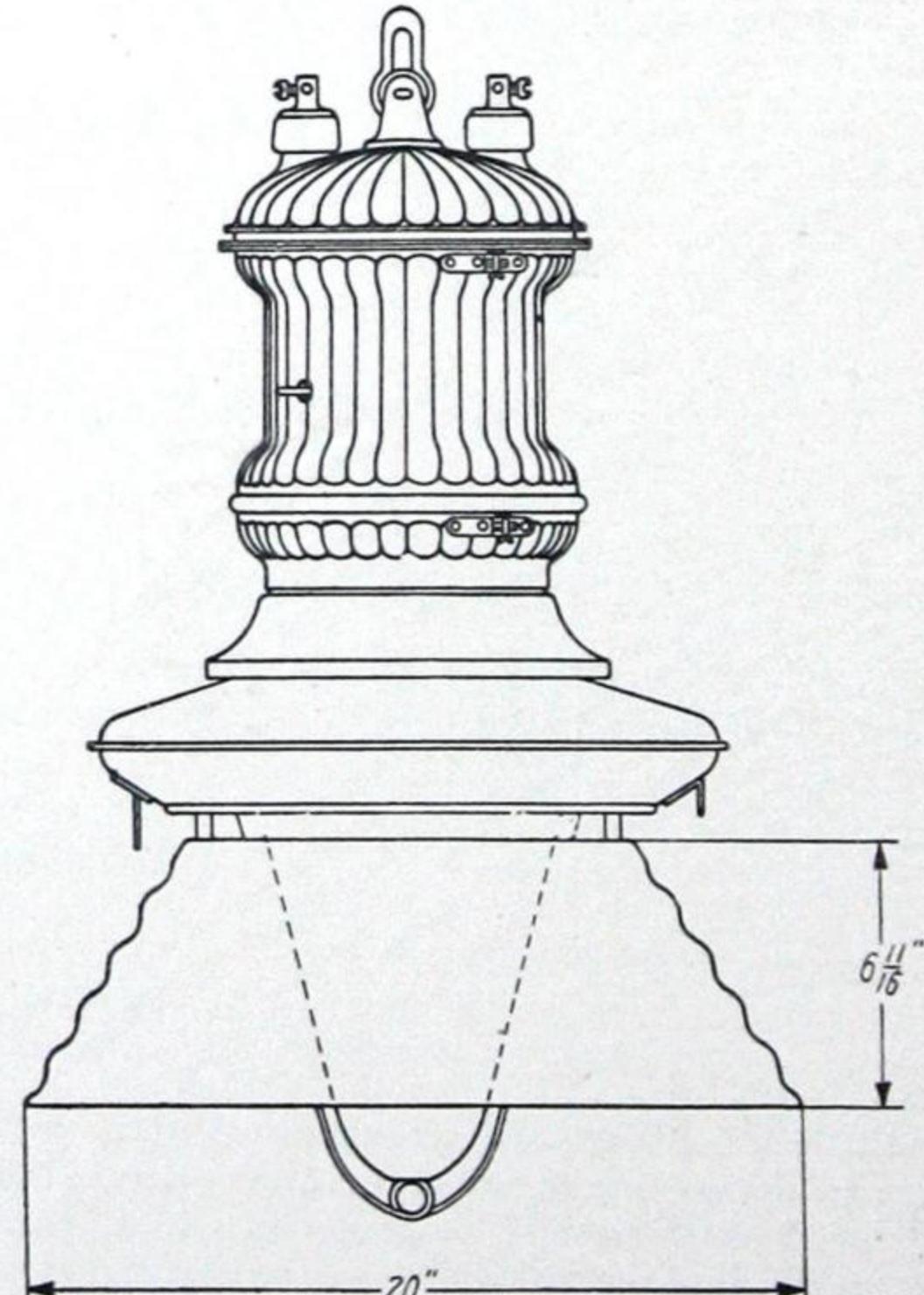
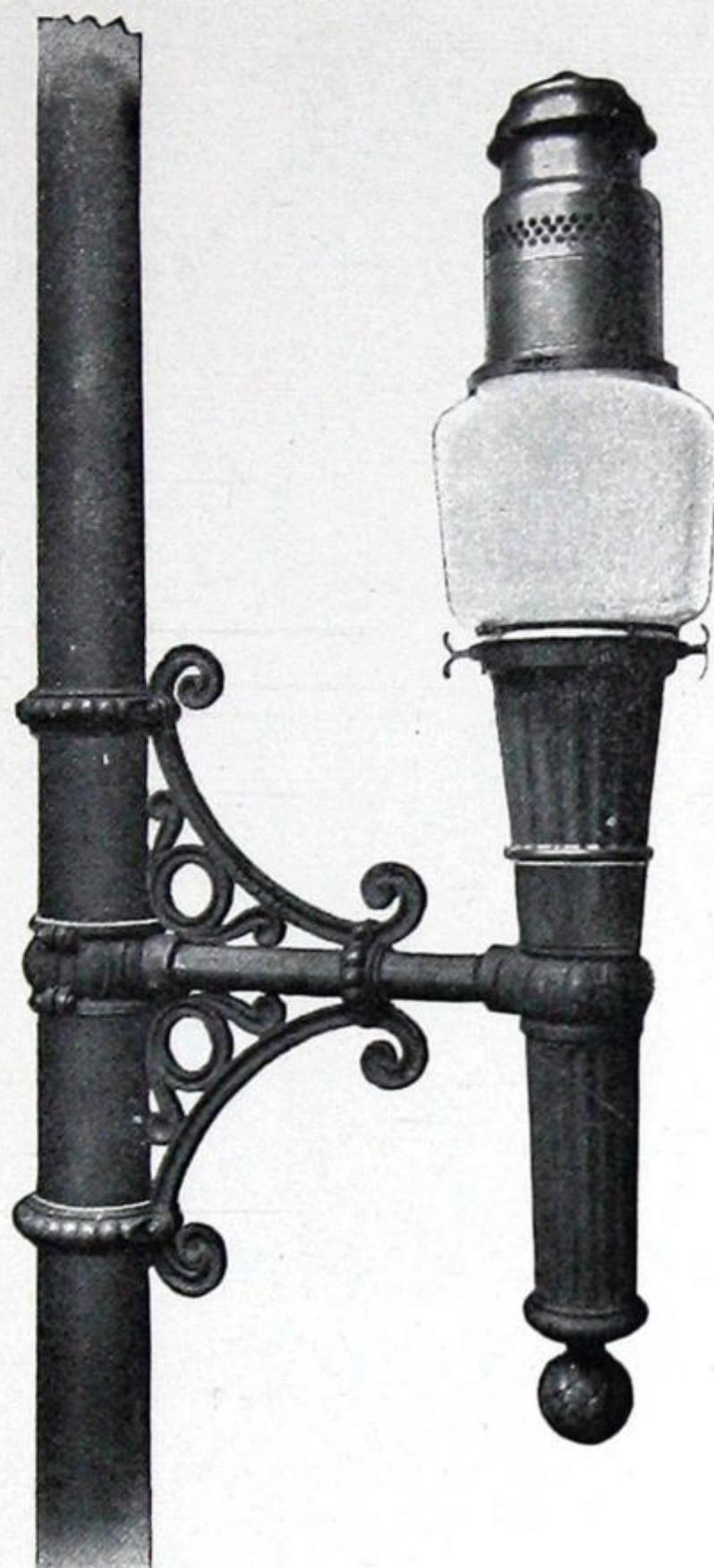


FIG. 4

WITH INDUSTRIAL REFLECTOR

## ALTERNATING-CURRENT TYPE O FLAME CARBON ARC LAMPS-(DS725)



TYPE O LAMP FOR BRACKET MOUNTING

The type O pillar flame-carbon arc lamp has been developed to meet the demand for an ornamental lighting unit of high intensity and efficiency. In particular it is well adapted to decorative or display lighting, "white ways," and boulevards. The lamp may be used on pillars of various heights or brackets properly mounted, thus making it a unit that is flexible in its application.

The type O flame-carbon arc lamp is the outcome of considerable engineering research and development. It contains all the desirable features of the standard type H flame-carbon arc lamp, as it consists largely of type H mechanism parts supported firmly on three uprights. Through this arrangement many obvious advantages are attained. The standard type H mechanism is well known.

The supporting uprights are between the inner and outer globes, and the glassware used is such as to eliminate all objectionable shadows. To trim the lamp the outer globe may be raised and locked into a position which will allow access to the inner globe and carbons. The trimming of one of these lamps is very simple operation.

The lamp is so designed as to set on an insulator which is adaptable to any ornamental post of  $6\frac{1}{2}$  inches maximum top diameter. The lamp may be set on posts of various heights, but posts are usually recommended to bring the arc  $14\frac{1}{2}$  or 18 feet above the pavement. When the lamp is mounted lower

than 18 feet denser diffusing glassware is recommended than is required at that mounting.

The distribution of light from this type of lamp is excellent. Besides lighting the street satisfactorily the architectural details and cornices of buildings are beautifully illuminated, a desirable feature for a unit used for "white way" purposes. The illumination produced is remarkably uniform and shadowless.

The carbon life per trim is somewhat over 100 hours, a desirable feature. The lamps are light and strongly built and present a graceful, symmetrical appearance. All parts have been designed for reliability in operation and long service.

### Special Features

Type O is very similar to type H in both operation and construction, in fact, it is identical except in the following differences:

**The outer globe** is supported on a casting resting on the capital of the lamp. For inspecting and trimming the lamp, a convenient arrangement enables the operator to raise the globe high enough to permit easy access to the arc and condensing chamber. A clamping ring attached to the globe at the top keeps it firmly in place and central with the lamp. By removing the upper shell of the lamp the entire mechanism is exposed.

**The Capital**—The casting that contains the lamp terminals and the resistors forms the capital of the pillar. Access to the terminals and the resistors is easily obtained by raising the globe as already described and removing a cover which separates the globe chamber from the capital chamber.

**A porcelain insulator** bolted to the base of the capital thoroughly insulates lamp from pillar. This insulator is in turn bolted securely to the pillar. Except for the necessary bolt holes and a central  $1\frac{5}{8}$ -inch hole for cable connecting lamp with line, the porcelain insulator is a solid piece. It has sufficient creepage surface and dielectric strength to render grounds impossible under ordinary operating conditions.

**Cutout Switch**—To insure complete protection for operator while trimming lamps an absolute **cutout switch** should be mounted in the base of each pillar. These switches as well as the cable connecting lamp with line are supplied by customer.

**The terminals** are located in the top



TYPE O PILLAR LAMP

## A.C. TYPE O FLAME CARBON ARC LAMPS—(DS725)—Continued

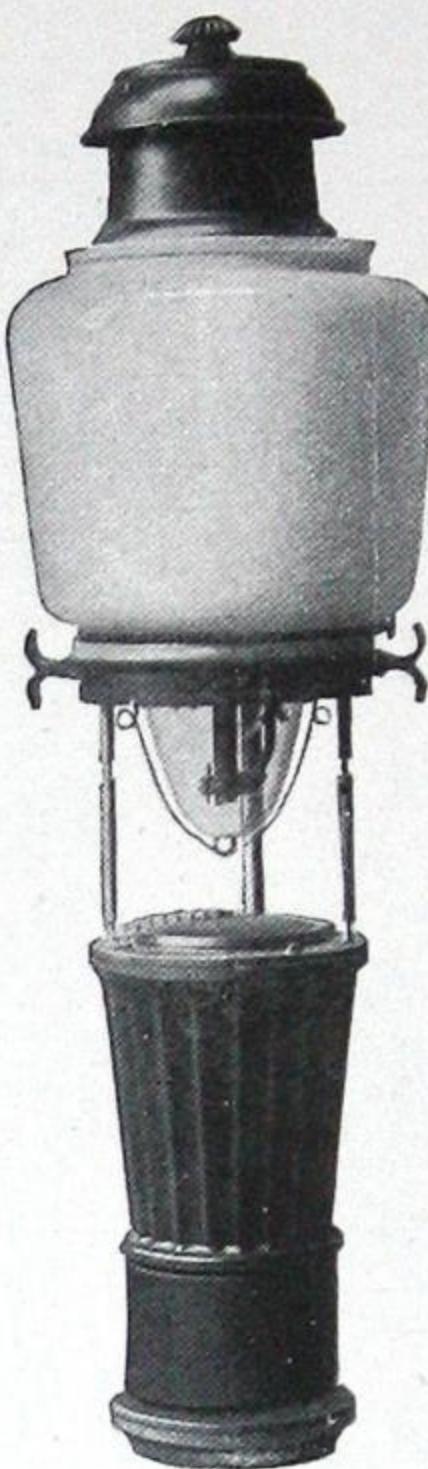
of the capital. They consist of easily accessible brass binding screws mounted on a suitable terminal block.



WITH GLOBE AND HOOD REMOVED

## Performance

**Multiple Lamps**—The following approximate performance will be obtained on these lamps:

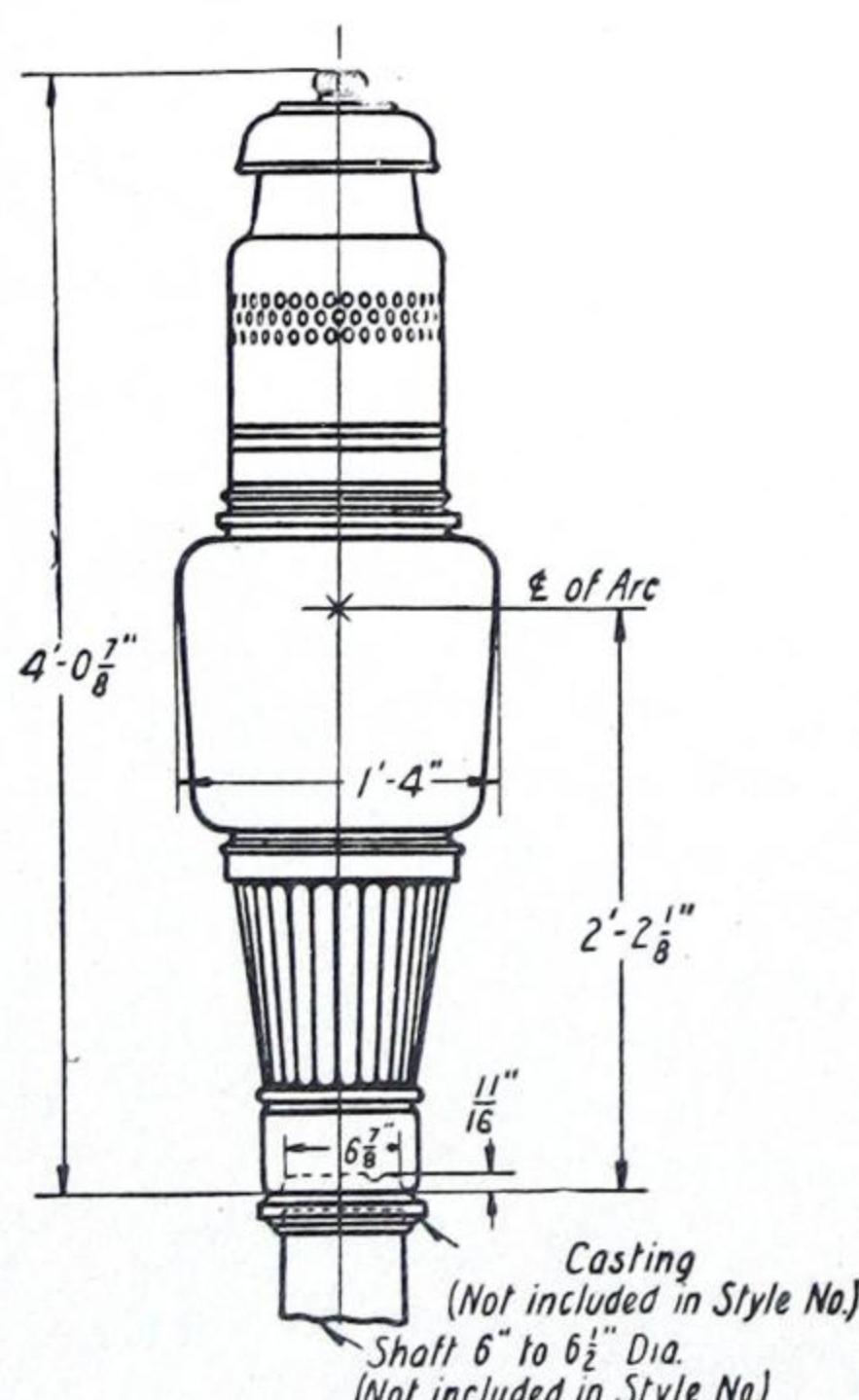


GLOBE RAISED FOR TRIMMING

	A.C. Multiple*	D.C. Multiple†
Lamp power factor	60.5%	715
Lamp watts	500	
Electrical efficiency	86%	63.5%

\*These performances will be secured with the 110-volt 60-cycle alternating-current multiple lamp when adjusted for 10 amperes and 48 volts at the arc. Performance of other alternating-current multiple lamps on application.

†These performances will be secured with the 110-volt 6.5 amperes direct-current multiple lamp when adjusted for 6.5 amperes and 70 volts at the arc.



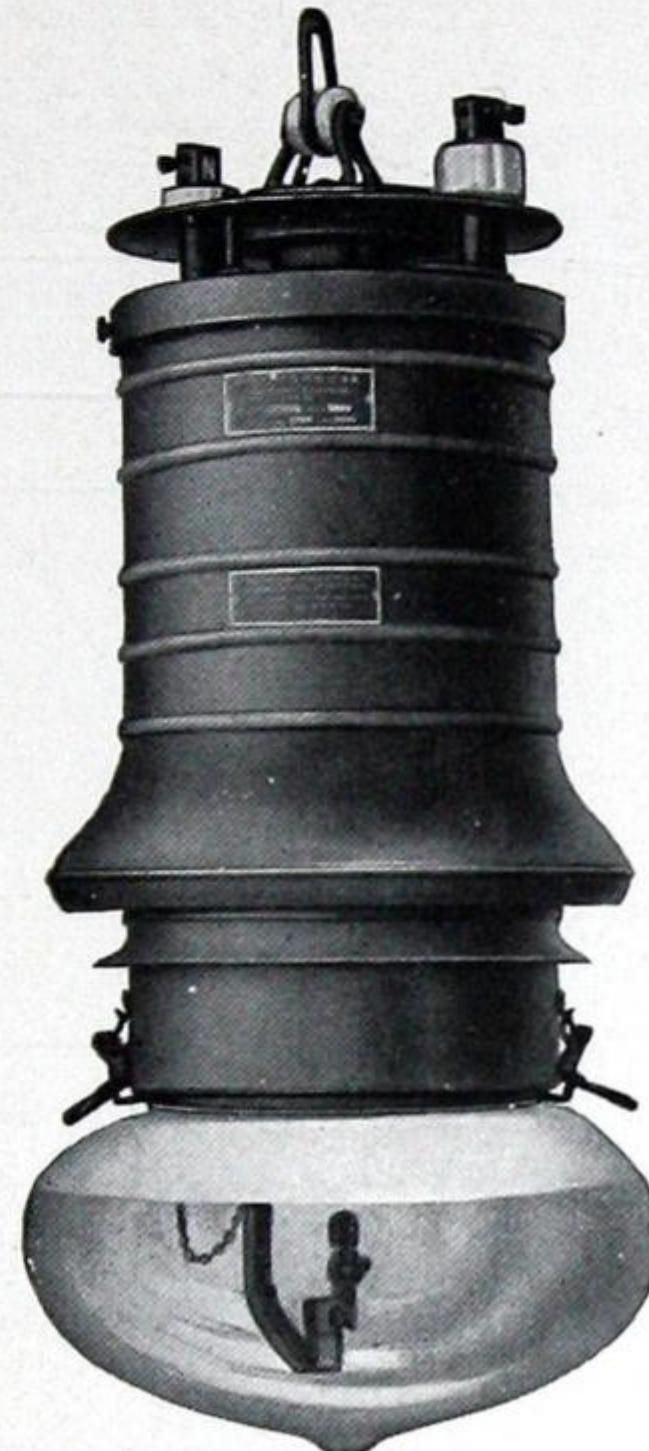
Style No.	Normal Terminal Volts	Range of Adjust. Volts	Amps. at Arc	Approx. Amps. at Terminals	APPROX. Net, With Glassware	Wt., Lb. Shipping, Without Glassware
<b>Multiple Lamps</b>						
198734*	110	100 to 125	10	7 and 7.5	125	190
210612*	220	200 to 250	10	3.5 to 4	130	195
198735†	110	100 to 125	6.5	6.5	110	175
<b>A.C. Series Lamps</b>						
193941*			10		112	175

\*Alternating-current, 60 cycles.  
†Direct current.

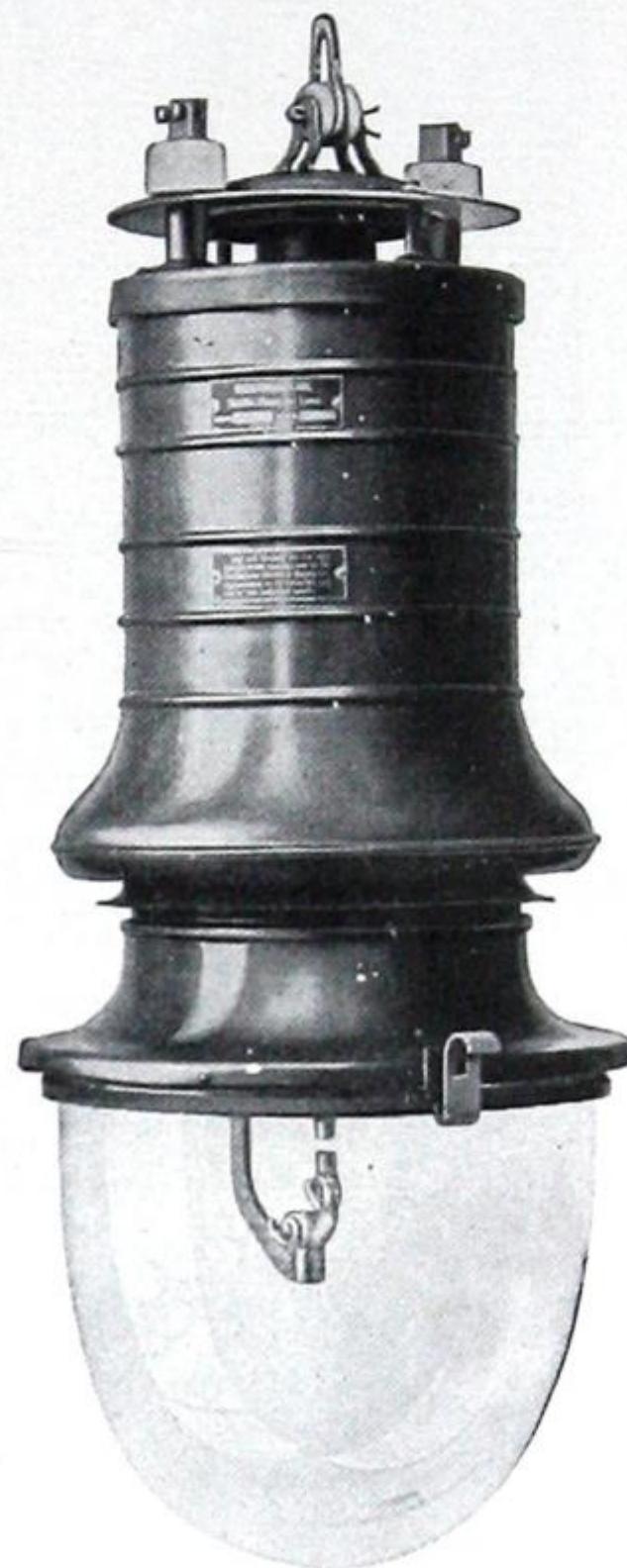
These dimensions are for reference only. For official dimensions apply to the nearest district office.

## METALLIC FLAME SERIES ARC LAMPS TYPES B AND C—(DS756)

FOR DIRECT CURRENT



TYPE B LAMP



TYPE C LAMP

Westinghouse metallic flame arc lamps represent the most advanced development in direct-current arc lamp practice for the lighting of large areas. The distribution of the light is ideal for street illumination or for railway shops and yards and other areas where high voltage is not prohibited. Its intense, white color, resembling daylight, makes it particularly desirable for such service. These series lamps can be operated only on constant direct current, obtained either by means of rectifier constant-current regulators or directly from constant-current arc generators of the proper current rating.

In the Westinghouse lamps the vapors produced by the metallic oxides of which the electrodes are composed, are not permitted to come in contact with any solid substance in the lamp chamber, and therefore do not deposit as soot. The construction is such that air currents pass down over the inner surface of the globe and down along the electrodes then out through a chimney. These air currents serve to carry off the vapors and soot and also to steady the arc so that it does not run up the side of the upper (negative) electrode.

**Distribution of Light**—The negative electrode is on top, so that most of the light is thrown downward. A corrugated enameled reflector is provided in the type C lamp to utilize the small part of the light emitted above the horizontal, and the globe is so designed that reflections from it are in a downward

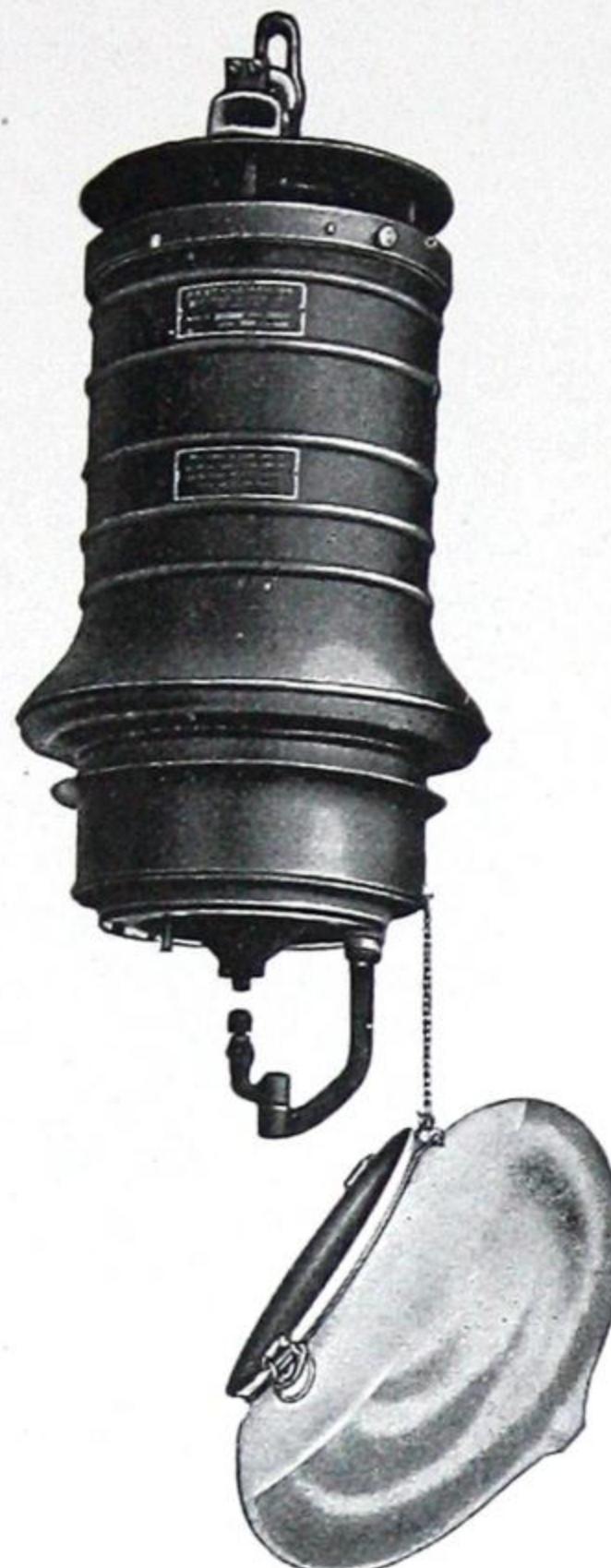
direction. The reflector is attached to the case and comes off with it when the lamp is opened. It is not necessary to loosen the reflector screws. In the type B lamp a globe containing an opaque reflector in the upper half can be furnished. The type B lamp does not have a metal reflector. In both types the lower electrode is stationary and the upper electrode feeds, maintaining the arc always within  $\frac{1}{2}$  inch of the same position.

**Lamp Mechanism**—The feeding mechanism is entirely free from floating parts and is remarkably simple and rugged. When the lamp is out, the upper electrode is held away from the lower and the cut-out contacts are closed. All magnets and electrical parts are of generous size and easily removed. The **starting resistors** are wound on grooved porcelain spools and are of special wire that does not become brittle or granular. The **cut-out** is extremely simple and reliable and has carbon and copper contacts. A non-sticking **dashpot** with self-lubricating graphite plunger, damps the armature of the feeding magnet. The **clutch** is a hardened steel punching similar to the clutch commonly used in carbon arc lamps.

**Insulation**—The simplicity of the lamp construction makes very few insulated parts necessary. Only solid mica and porcelain insulation are used. Each lamp is tested at 3000 volts alternating current for one minute before shipping.

## METALLIC FLAME SERIES ARC LAMPS—(DS7-C)—Continued

**Frame**—The frame consists of heavy metal punchings and is therefore practically unbreakable, yet light in weight. The main portion of the frame is



TYPE B LAMP

formed by the chimney tube, hung from a heavy, punched cap which carries the two terminal posts and the hanger.

**Hanger**—A loop of non-corrosive metal reinforced at the top, where wear is greatest, provides means of suspension. This loop encircles a porcelain insulator that is held in a punched sheet yoke with a heavy cotter pin.

**Terminals**—Two-screw binding posts drilled for No. 4 wire are held securely in porcelain insulators. The square shanks of these posts prevent twisting.

**Case**—This is formed from heavy, black-finished copper. It is of the entirely-removable, slip type, and is secured in place with a three-point bayonet joint at the top. A knurled machine screw, inserted through the case near its top, and turned into a hole in the frame, effectively locks it in position. The case can be locked in any one of the three positions at which the bayonet joints will engage. When the case is taken off the entire lamp mechanism is exposed and rendered very accessible for inspection.

**Electrodes**—A mixture of metallic oxides forms the upper (negative) electrode, and the lower (positive) electrode is a composite metal button. The upper electrode is 16 inches long and approximately  $\frac{1}{2}$  inch in diameter. Both electrodes are changed at each trimming.

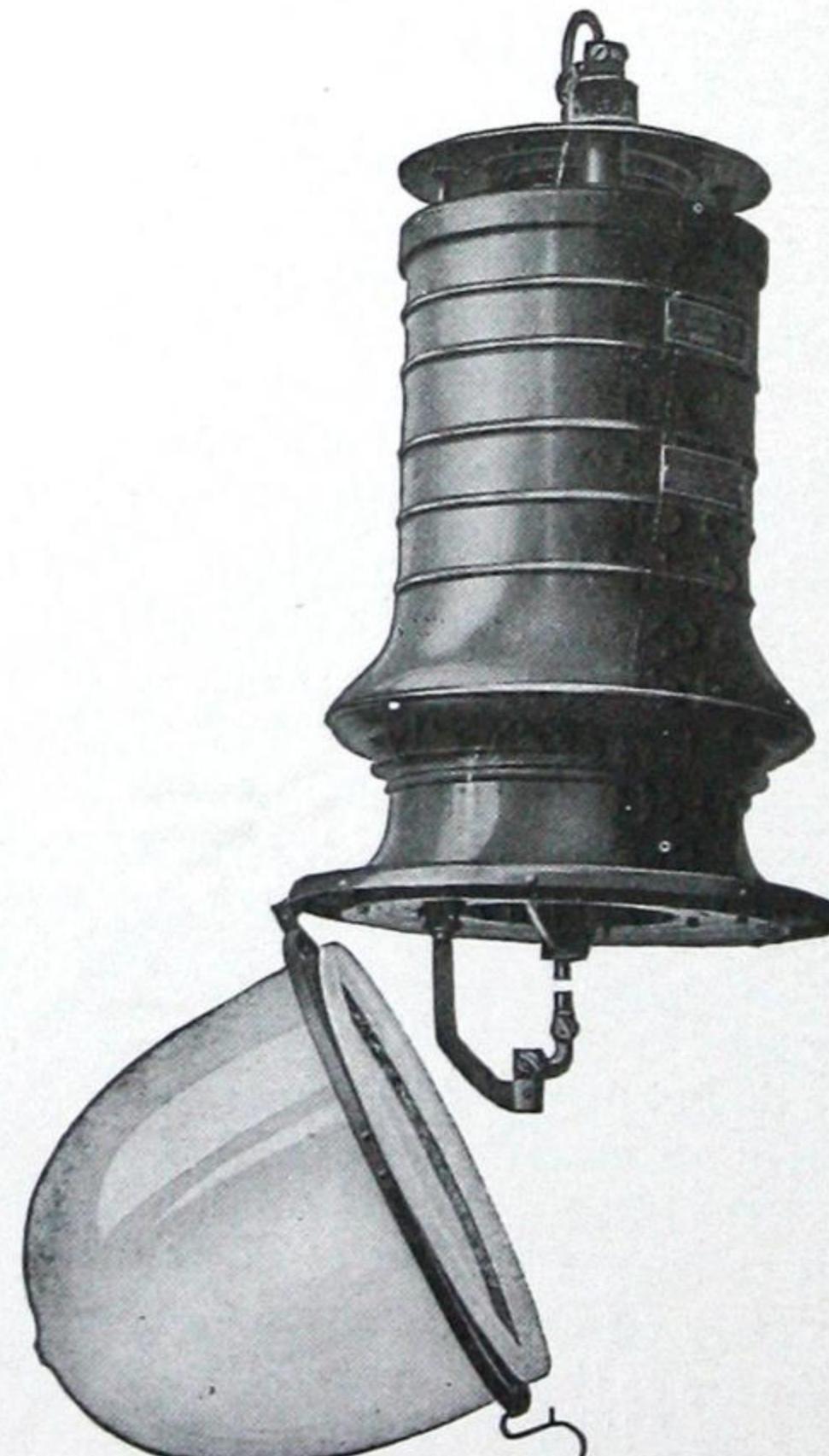
**Electrode Holders**—The positive electrode is held on a goose-neck casting so arranged that it can be swung to one side when inserting the negative elec-

trode. The negative electrode is held in a split bronze sleeve having a stem with a flexible conductor attached to its upper end. This holder slides in a guide tube which protects the holder from fouling due to deposit of the arc vapors, and is also arranged to prevent twisting.

**Burning Life**—An average burning life of 250 hours is guaranteed for both electrodes when operating on 4 amperes, and 115 hours on 6.6 amperes. However, the average life of electrodes in actual operation is about 275 and 125 hours respectively.

**Adjustments**—All Westinghouse metallic flame arc lamps are adjusted, before shipping, for a  $\frac{7}{16}$ -inch arc length, which will ordinarily give an average terminal voltage of 68. As indicated in the list, two different styles can be furnished. One is adjusted for a current of 4 amperes and the other for 6.6 amperes. The same lamp cannot be adjusted for both currents. Two adjustments are provided, one for the length of the arc and the other for maintaining the voltage across the arc at its normal value. The length of arc is adjusted by means of a screw that permits the electrodes to be so spaced as to obtain a normal arc voltage. The shunt cut-out adjustment limits the voltage of the lamp to a predetermined maximum.

**Finish**—The copper case is given a black oxidized finish. It is pleasing in appearance and very durable.



TYPE C LAMP

**Types**—The types B and C lamps are identical mechanically and electrically except for the case and globe.

## METALLIC FLAME SERIES ARC LAMPS—(DS756)—Continued

**Globe Holders**—The globe holder of the type B lamp consists of a ring of heavy phosphor-bronze wire. The globe is suspended from the lamp by a short chain when trimming. The globe holder of the type C lamp consists of a spring band hinged to the lower part of the case allowing the globe to be swung to one side when trimming.

**Globe Screen**—The globe screen is a small perforated disk of galvanized sheet steel placed in the bottom of the globe to protect it from any hot particles which may drop from the electrodes. The screen is regularly furnished with all type C lamps and with 6.6-ampere type B lamps. It is not regularly furnished with the 4-ampere type B lamp as it is considered unnecessary, but will be furnished if desired.

**Repairs**—Standard screws are used throughout the lamp. A complete price list of repair parts will be sent on application.

**Accessories**—For information concerning glassware, electrodes, etc., see pages covering "Arc Lamp Accessories."

For further information see circular on "Mercury Rectifier Arc Lighting Systems," which will be sent to anyone on application.

**Prices**—Style number includes lamp complete with globe and one set of electrodes, and with globe screen when desired.

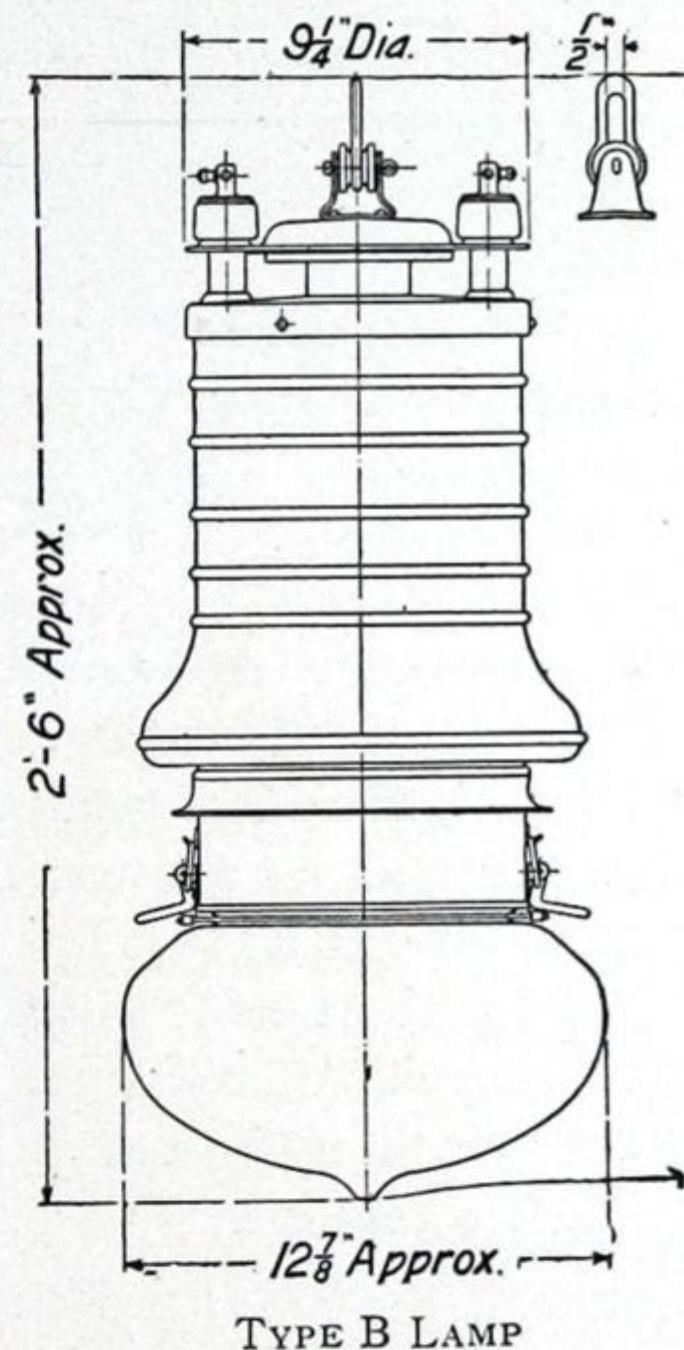
Style No.	Type	Current	Watts	List Price
162498	C	6.6	449	
162497	C	4.0	272	Prices on
126199	B	6.6	449	Application
126200	B	4.0	272	

## Approximate Weight

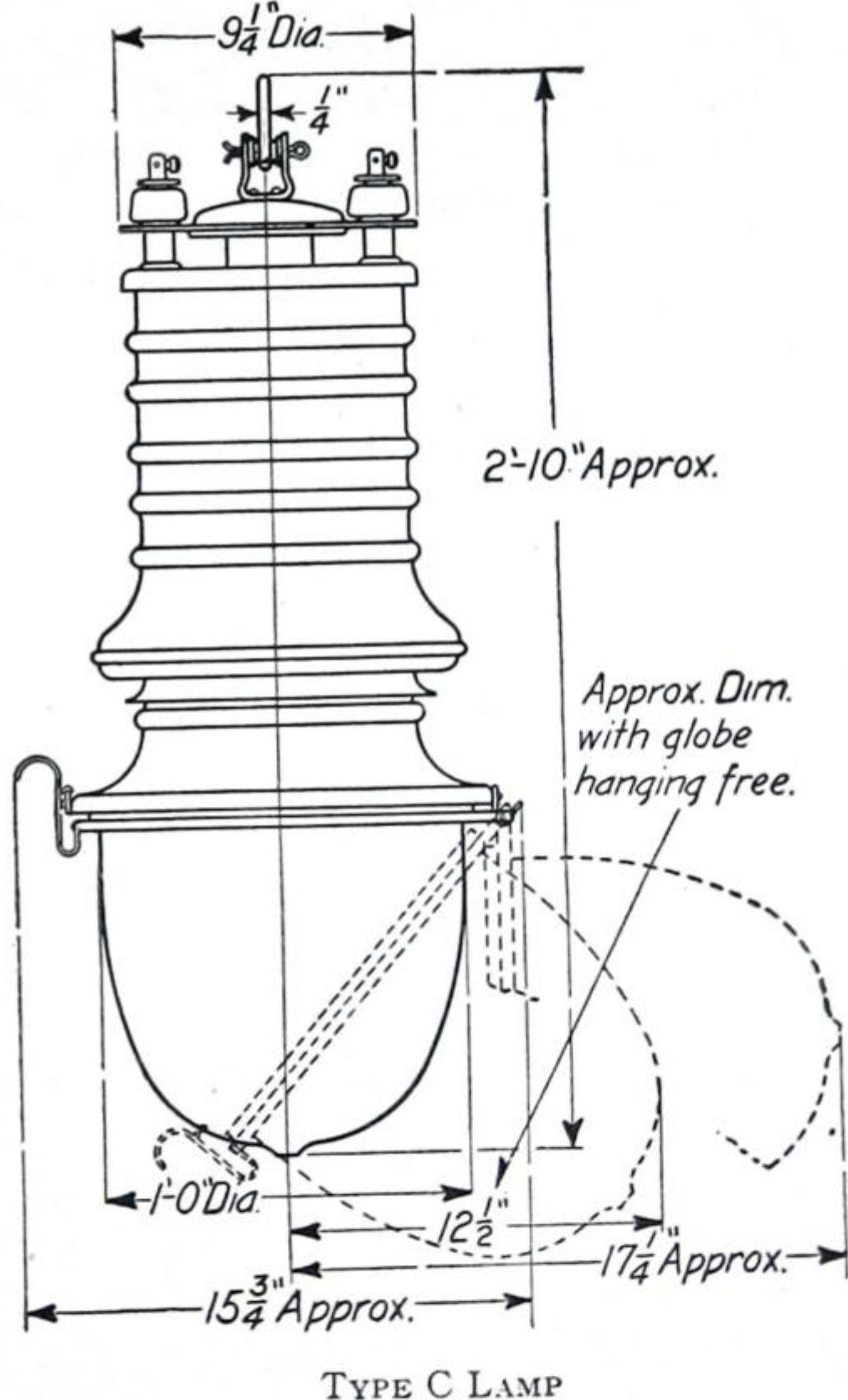
Net, with glassware—Type B, 42 lb.; type C, 45 lb.

Shipping, without glassware—Type B, 65 lb.; type C, 68 lb.

## OUTLINE DIMENSIONS



TYPE B LAMP



TYPE C LAMP

These dimensions are for reference only. For official dimensions apply to the nearest district office.

*Order by Style Number*

## WESTINGHOUSE-COOPER HEWITT RECTIFIER CONSTANT-CURRENT REGULATING TRANSFORMERS—(DS778)

**Application**—The Westinghouse-Cooper Hewitt rectifier outfits described herein are designed to permit the operation of direct-current series arc lighting systems from single-phase alternating-current circuits. By the use of these outfits, the advantages gained from alternating-current distribution at any commercial frequency are combined with the superior illuminating qualities of direct-current arc lamps. The outfits are applicable to any type of direct-current series arc lamps but are especially adapted for use with the Westinghouse metallic flame arc lamps. They are used in connection with the control panels described on other pages of this catalogue.

**Distinctive Features**—Among the particularly advantageous features of the Westinghouse-Cooper Hewitt rectifier outfit may be mentioned the following:

1. Self-contained and compact units, with no external starting transformer, choke coils, or rectifier bulb-tanks.
2. Rugged construction.
3. High operating efficiency and good power factor.
4. Close current regulation.
5. Convenient arrangement for connecting the bulbs which renders them accessible for inspection.
6. Simplicity of installation and operation.
7. Simplicity of connections between regulator and panel.
8. Automatic starting device with negligible losses.
9. Absence of static discharges.

**Standard Outfits**—Standard rectifier outfits are furnished with characteristics as follows:

Lamp currents—4 and 6.6 amperes.

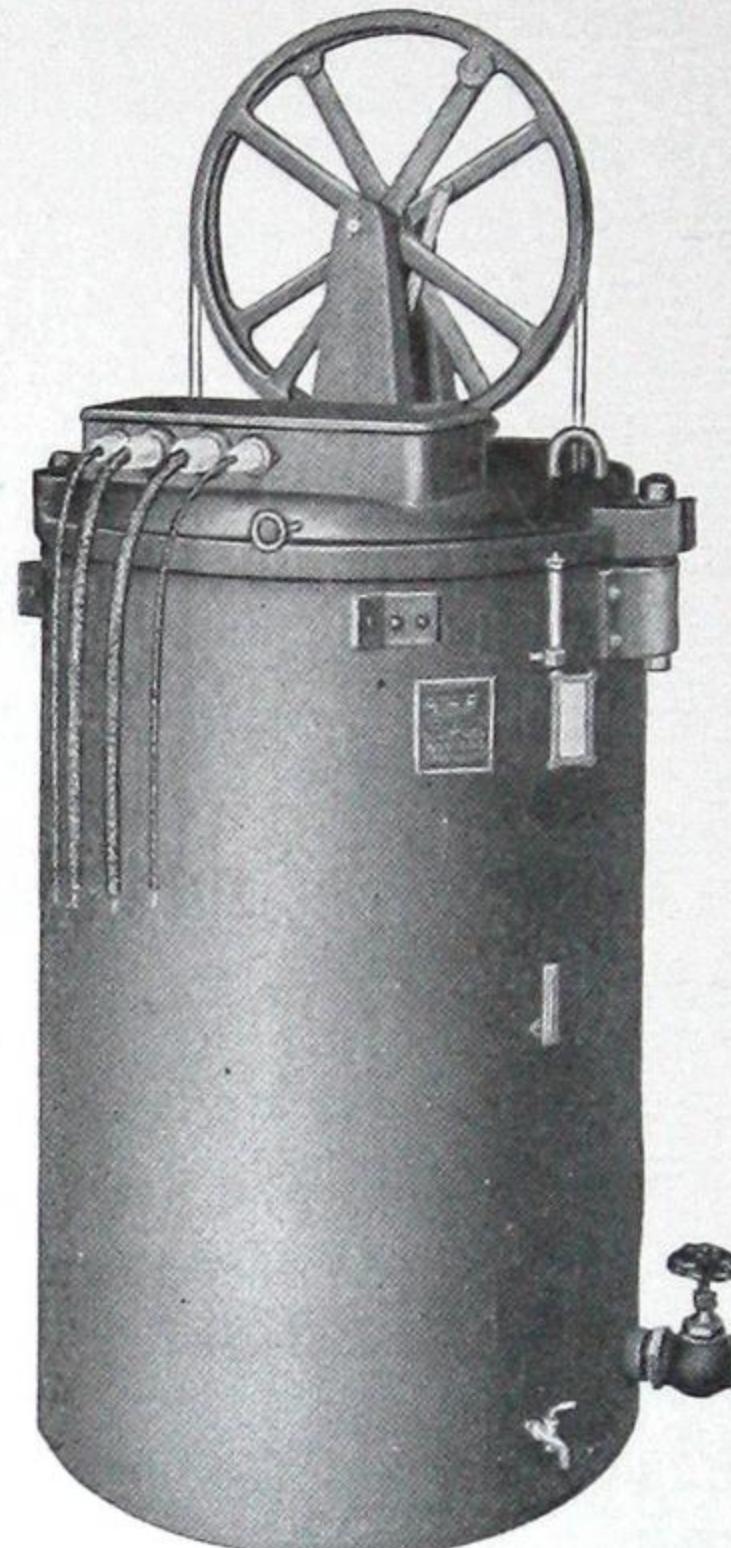
Capacities—25, 35, 50, 75, and 100 4-ampere arc lamps, and 25, 35, 50, and 75 6.6-ampere arc lamps.

Primary voltages—230, 460, 1150, 2300, 6900, 13800, volts

Frequencies—25 and 60 cycles.

**Special outfits** can be furnished for a secondary current of 5.5 amperes if desired. They can also be furnished for any voltage between the minimum and maximum voltages mentioned above and for any frequency between 25 and 60 cycles. The Company recommends, however, the purchase of standard outfits wherever possible, as the price and time of delivery are both less than for apparatus built to order. Prices and full information covering special outfits will be furnished on application.

**Construction**—The constant current rectifier outfit consists essentially of a constant-current regulating transformer and one or more Cooper Hewitt rectifier bulbs, mounted in a cylindrical boiler-iron tank. The complete outfit is entirely self-contained, the transformer, rectifier bulbs, and



50-LIGHT OUTFIT COMPLETE

necessary connections all being immersed in oil in a case which is mechanically strong, fire-proof, and practically indestructible. An arc occurring in such a case would be immediately extinguished just as in an oil-switch, and fire could not communicate either to or from the regulator, on account of its ironclad construction. The use of oil also has the usual advantages of making the outfits particularly strong from an insulation point of view, and of forming a cooling medium which maintains a uniform and stable operating temperature.

This construction affords a compact piece of apparatus that requires small space and has no mechanical connection with any other machinery. The outfit is shipped in complete adjustment, it being necessary only to remove the packing materials, place the coil-carrying cables on the wheels, and lower the transformer into its tank which has been filled with oil, and the unit is ready for operation.

**Connections**—Two leads are brought out for connection to the alternating-current supply circuits and two leads for the direct-current lamp circuit, making only four leads altogether between the regulator and the panel for the 25, 35, and 50-light outfits.

A fifth lead is brought out of the 75-light transformer and carried to the panel for starting purposes.

The 100-light transformer has two 50-light secondary circuits and consequently has six leads.

These leads are taken directly to the control panel, which is usually mounted directly in front of the regulator.

## RECTIFIER C. C. REGULATING TRANSFORMERS—(DS778)—Continued

**Transformer**—The transformer is of the well-known repulsion type, depending for its current regulation upon the repulsion existing between the fixed and movable coils. There are two primary and two secondary coils; the primary coils are balanced against each other, suspended by means of steel cables running on wheels mounted on the cover

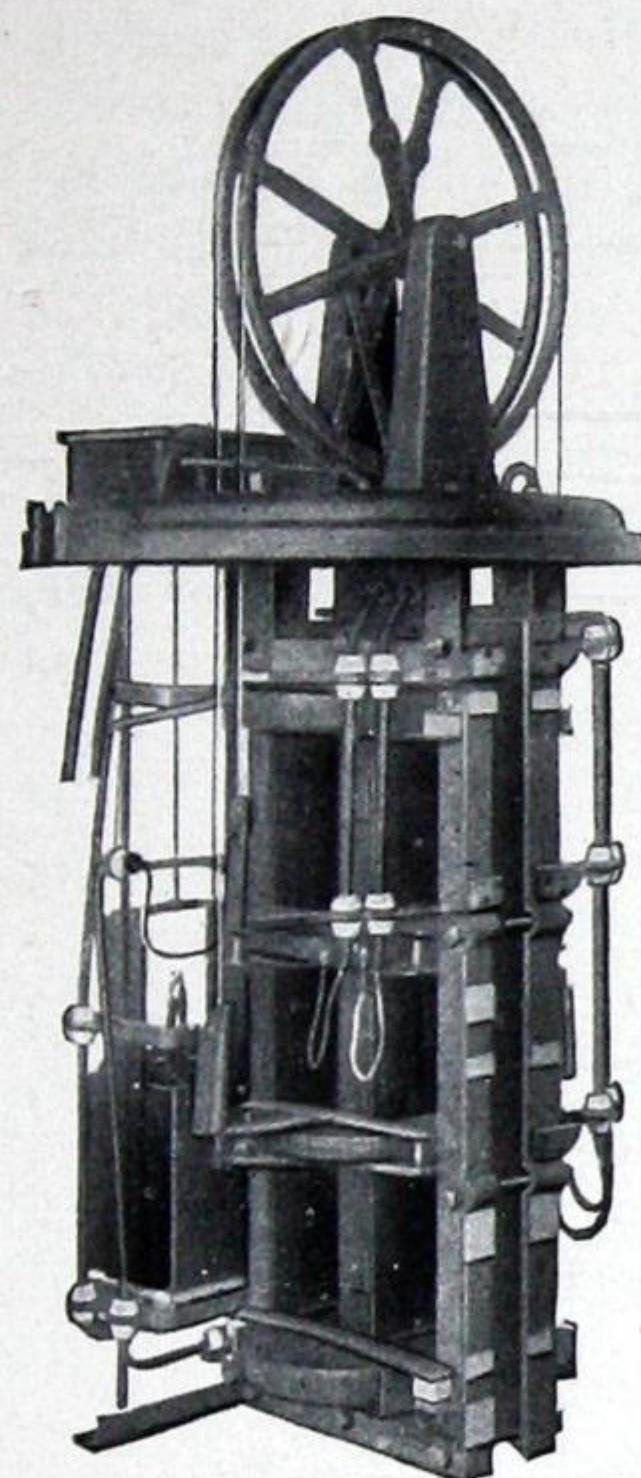
of the outfit and are free to move toward and away from the secondary coils which are stationary and are mounted one at each end of the core.

The adjustment at the Works establishes the rated current in the secondary winding under normal conditions of load, voltage, and frequency. Any change in the primary voltage or load conditions tends to change this secondary current which in turn changes the electrical repulsion between the primary and secondary coils. This results in movement of the primary coils to the position where the repulsion is again equal to the original repulsion, which only occurs when the correct secondary

current is re-established. The wheels are mounted on roller bearings which are practically frictionless, making the coils quite sensitive to slight changes in repulsion, and the current regulation of the transformer is excellent.

**Insulation Tests**—All coils are impregnated with an insulating compound and are tested before assembling with a voltage considerably in excess of the normal operating voltage. After being assembled, the coils, the internal wiring and connections, and the outgoing leads are subjected to a one-minute ground test of at least double the normal voltage and an over-potential test of double normal operating voltage for five minutes.

**Taps** are brought out from the primary windings so that the effective number of turns can be varied to take care of different operating voltages and wave shapes. These taps are carried to a terminal board which is mounted below the level of the oil in a location that makes it a simple matter to change the taps from the opening in the cover. Links are provided for four different combinations of taps. A combination of taps will be found for any wave shape coming within the limits established by the American Institute of Electrical Engineers for a sine wave, but it is not expected that the outfit will operate satisfactorily at full load on a primary volt-



50-LIGHT RECTIFIER REMOVED  
FROM CASE

tage less than 90 per cent of the voltage for which it is designed.

The secondary windings are also provided with taps to give full-load efficiency and power factor when carrying only 85 per cent of the normal rated load continuously. The operating efficiency and power factor at light loads are improved by means of these taps but the output is limited to 85 per cent of the normal rating.

**Rectifier Bulbs**—The rectifier bulb is a pear-shaped glass vessel, about 7 inches at its greatest diameter, with four terminals or electrodes, the two upper electrodes being the anodes which are connected to the secondary winding of the transformer and the two lower electrodes being the cathodes which are connected to the direct-current circuit through the starting transformer. The air is exhausted from the bulb and the vapor from the mercury which surrounds the cathode terminals is the means by which the rectifying effect is obtained.

The life of a bulb, assuming no carelessness in handling, depends upon the evenness of the operating temperature. The fact that the bulb is immersed in a large body of oil in the Westinghouse outfits insures an even and stable temperature which is largely responsible for the commercial success of the system.

The bulb is mounted on tilting trunnions in a wooden box which is so arranged that it can be lifted out by a handle through an opening in the top of the tank without disconnecting any leads. By means of spring contacts on the bottom of the box and fixed contacts on a terminal board inside the tank, all connections between the bulb and the regulator are made automatically when the box is lowered into place. To replace a bulb it is simply necessary to lift out the containing box by the handle, put in a new bulb and slide the box back into place on its guides. The terminals of the bulb are provided with metal thimbles to which connections are made by spring clip connectors. The same standard bulb box is used in all Westinghouse-Cooper Hewitt rectifier outfits and they are therefore entirely interchangeable.

In all the bulb boxes a self-starting attachment is provided, known as the "condenser lead," and this device makes the rectifier semi-self-starting, in that it will cause the bulb to start up and rectify as soon as the primary circuit is closed. After a bulb has been in use for a few days it will be found that the action is almost automatic, the bulb in nearly every case starting immediately after the primary switch controlling the rectifier is closed.

When installing a new bulb, the outfit is started by tilting the bulb by means of the handle mounted on the control panel until the mercury in the two lower electrodes bridges the space between them and thus short-circuits the starting transformer, which is energized from an auxiliary coil in the main transformer. When the bulb is returned to a vertical

## RECTIFIER C. C. REGULATING TRANSFORMERS—(D3778)—Continued

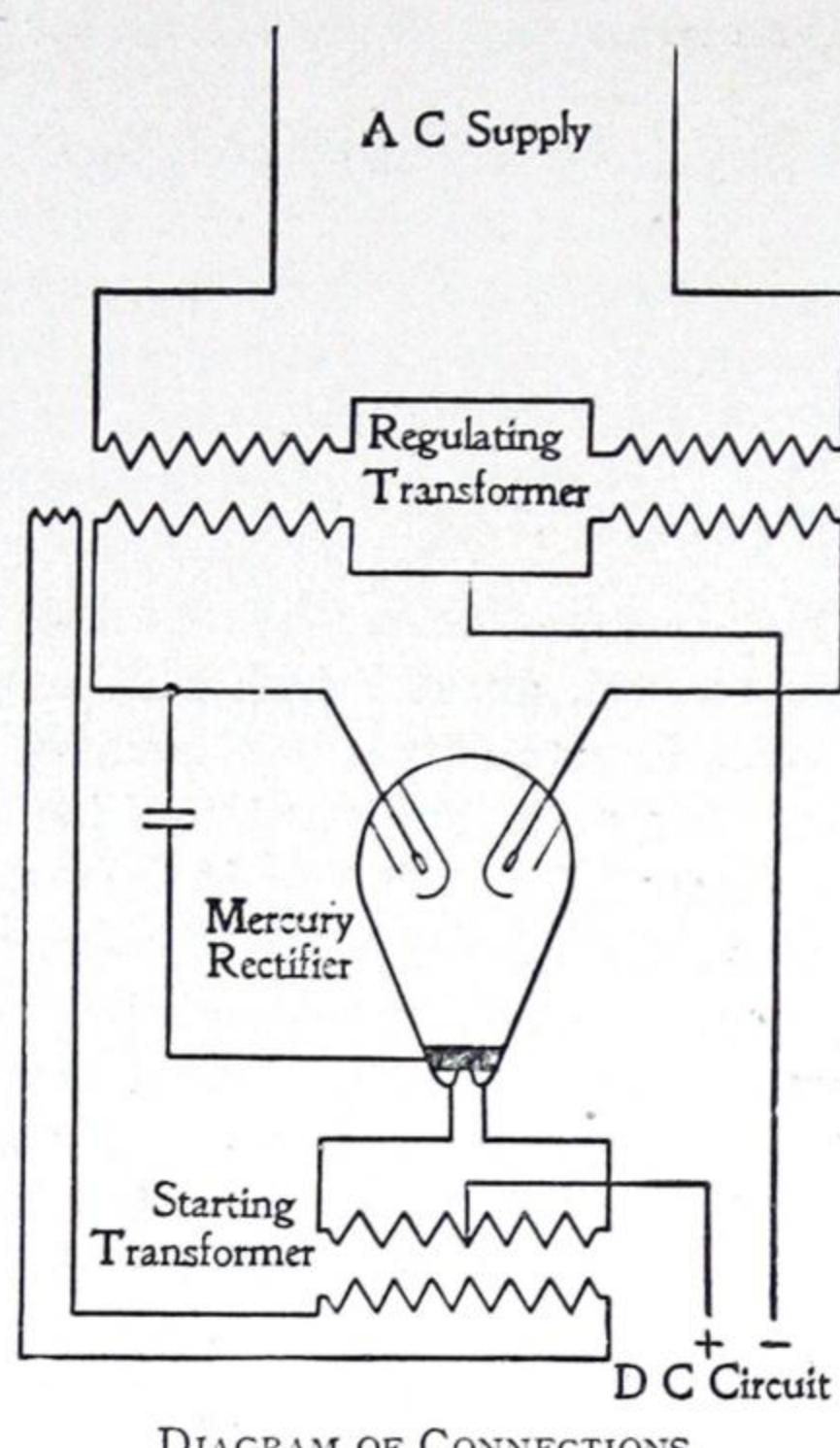


DIAGRAM OF CONNECTIONS

position, the breaking of the mercury bridge produces a spark which starts the rectifier.

**Operation**—For successful operation, the primary coils of the regulating transformers must float at least two inches away from the secondary coils in order to have margin enough to take care of the ordinary fluctuations of the primary voltage and the unstable conditions in the secondary circuits due to the feeding of the arc lamps. The closer the primary and secondary coils are together the higher will be the operating power factor. The regulator is accordingly designed to operate with as small a coil separation at full load as will permit successful operation, and for that reason there is practically no overload capacity.

Westinghouse-Cooper Hewitt rectifier outfits provide a close regulation of the lamp current when carrying any load from 25 per cent to 100 per cent of their rated capacity.

**Water-Cooled Outfits**—The 100-light outfits and the 6.6-ampere, 75-light outfits are designed for water cooling, being provided with cooling coils suspended inside the tank. These outfits are so liberally designed that they can be run without water for a considerable period without excessive heating.

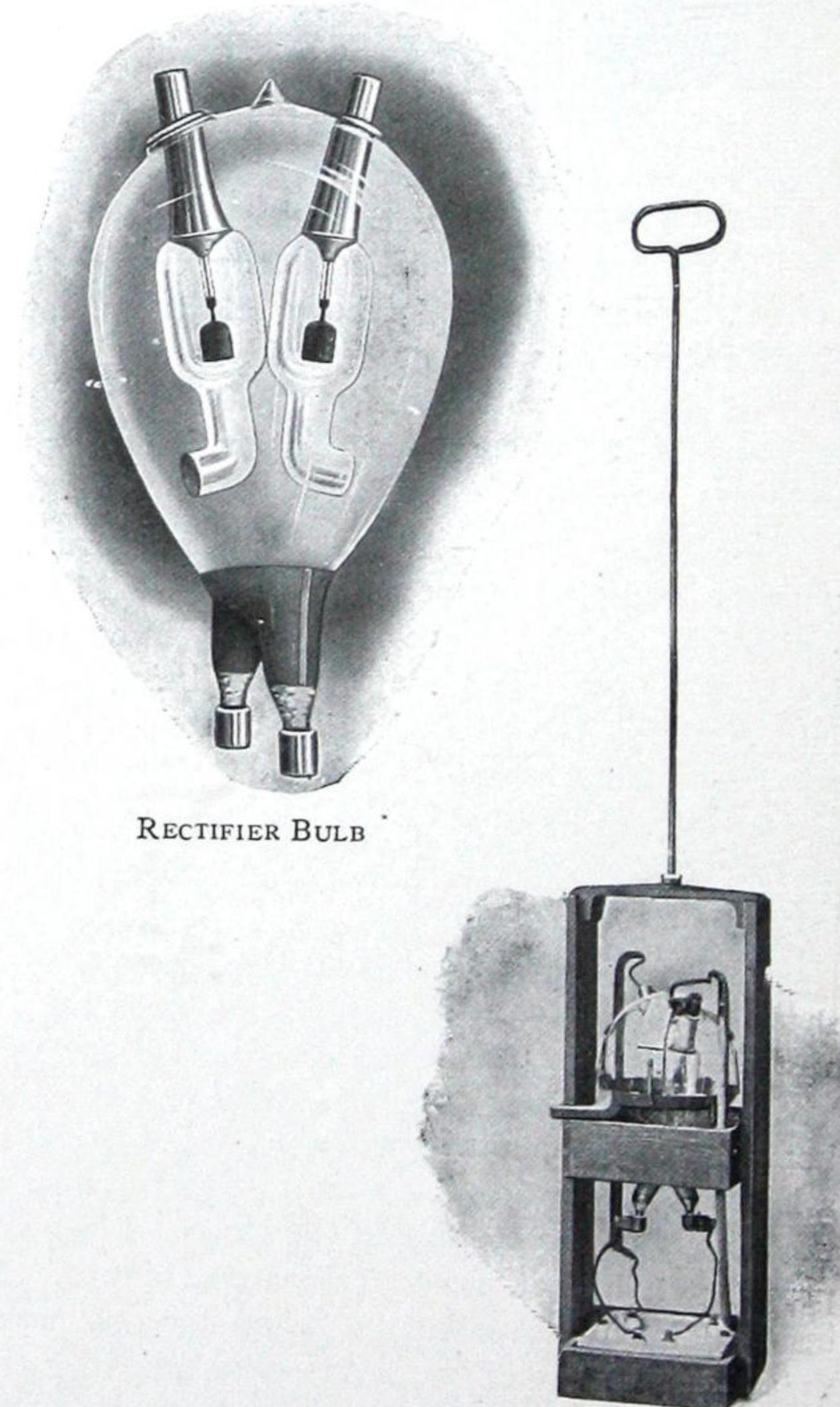
**25 to 75-Light Outfits**—All standard outfits except the 100-light size, have the two primary coils balanced against each other with no external counter weights, and the secondary provides one circuit for the lamps. One bulb is used in the 25, 35, and 50-light sizes, while in the 75-light size, two bulbs are used in series to reduce the potential strain across the bulbs.

By the use of two standard rectifier outfits and an auto-transformer, a balanced load may be ob-

tained on a 3-phase circuit, or the auto-transformer can be omitted and the regulators connected to separate phases if desired.

**100-Light Outfits**—This outfit provides for two independent circuits of 50 lights each. To secure independent regulation for the two circuits, each primary coil is balanced by means of its own counter-weight on the outside of the tank. Two bulbs are used, one for each circuit. The 100-light outfit is equivalent to two 50-light outfits; one circuit can be operated without the other if desired, or the load may be divided in any desired proportion. This outfit is made only for 4-ampere, 60-cycle service. Two standard outfits, providing four lamp circuits, can be connected by means of an auto-transformer as a balanced load on a three-phase system just as in the case of the smaller outfits. One outfit, however, providing two lamp circuits, cannot be connected as a balanced load on a 3-phase system.

For a full description of the operation of the rectifier bulbs, see Circular on Series Arc Lighting Systems with Westinghouse-Cooper Hewitt Rectifiers, and for a description of the operation of the complete outfit, with data covering installation, operation and repairs, see Instruction Book.



RECTIFIER BULB AND BOX

**RECTIFIER C. C. REGULATING TRANSFORMERS—(DS778)—Continued**

## RATINGS AND STYLE NUMBERS

Style number and list price include regulating transformer with oil but without bulb. For style numbers of bulbs see below.

## COOPER HEWITT RECTIFIER BULBS

Style number and list price cover bulb complete ready to be connected into the circuit.

Style No.	Description	Prices Furnished on Request
<b>95504-E</b>	For all outfits	

Approximate weight of one bulb packed in crate is 20 pounds.

Approximate weight of two bulbs packed in crate is 25 pounds.

## APPROXIMATE WEIGHTS AND OUTLINE DIMENSIONS

Cycles	Capacity in Lights	Weights Without Oil		Gals. Oil*	Greatest Width Including Valve	Overall Dimensions			Height to Center Line of Terminals
		Net	Gross			Width of Top Includ- ing Lugs	Height	Diameter of Tank	
<b>4-Ampere Rectifier Outfits</b>									
25	25	3400	4400	320	4'- 6 <sup>1</sup> / <sub>8</sub> "	4'- 0 <sup>3</sup> / <sub>4</sub> "	8'-1 <sup>1</sup> / <sub>2</sub> "	3'-6 <sup>1</sup> / <sub>2</sub> "	5'- 6 <sup>7</sup> / <sub>8</sub> "
	35	4500	5700	535	5'- 4 <sup>3</sup> / <sub>4</sub> "	5'- 1"	9'-3 <sup>1</sup> / <sub>8</sub> "	4'-	5'- 9 <sup>3</sup> / <sub>4</sub> "
	50	5000	6400	535	5'- 3 <sup>5</sup> / <sub>16</sub> "	4'-11 <sup>5</sup> / <sub>8</sub> "	9'-3"	5'-4 <sup>1</sup> / <sub>2</sub> "	5'- 9 <sup>5</sup> / <sub>8</sub> "
	75	6400	8100	680	5'-10 <sup>3</sup> / <sub>4</sub> "	5'- 3 <sup>3</sup> / <sub>4</sub> "	10'-1 <sup>1</sup> / <sub>4</sub> "	4'-9	6'- 3 <sup>1</sup> / <sub>4</sub> "
60	25	2800	3700	350	4'- 6 <sup>1</sup> / <sub>8</sub> "	4'- 0 <sup>3</sup> / <sub>4</sub> "	8'-1 <sup>1</sup> / <sub>2</sub> "	3'-6 <sup>1</sup> / <sub>2</sub> "	5'- 7"
	35	2950	3900	335	4'- 6 <sup>1</sup> / <sub>8</sub> "	4'- 0 <sup>3</sup> / <sub>4</sub> "	8'-1 <sup>3</sup> / <sub>8</sub> "	3'-6 <sup>1</sup> / <sub>2</sub> "	5'- 6 <sup>7</sup> / <sub>8</sub> "
	50	3100	4100	335	4'- 6 <sup>1</sup> / <sub>8</sub> "	4'- 0 <sup>3</sup> / <sub>4</sub> "	8'-1 <sup>3</sup> / <sub>8</sub> "	3'-6 <sup>1</sup> / <sub>2</sub> "	5'- 6 <sup>7</sup> / <sub>8</sub> "
	75	4500	5800	535	5'- 3 <sup>5</sup> / <sub>16</sub> "	4'-11 <sup>5</sup> / <sub>8</sub> "	9'-3"	4'-4 <sup>1</sup> / <sub>2</sub> "	5'- 9 <sup>5</sup> / <sub>8</sub> "
	100	6400	7800	625	5'- 9"	4'-11 <sup>3</sup> / <sub>8</sub> "	8'-4 <sup>7</sup> / <sub>8</sub> "	4'-9 <sup>1</sup> / <sub>2</sub> "	5'-11"
<b>6.6-Ampere Rectifier Outfits</b>									
25	25	4800	6100	550	5'-3 <sup>3</sup> / <sub>8</sub> "	4'-10 <sup>1</sup> / <sub>4</sub> "	9'-3 <sup>1</sup> / <sub>8</sub> "	4'-4"	5'-9 <sup>3</sup> / <sub>4</sub> "
	35	5800	7300	525	5'-3 <sup>3</sup> / <sub>8</sub> "	4'-10 <sup>1</sup> / <sub>4</sub> "	9'-3 <sup>1</sup> / <sub>8</sub> "	4'-4"	5'-9 <sup>3</sup> / <sub>4</sub> "
	50	8100	10300	750	6'-2 <sup>3</sup> / <sub>4</sub> "	5'- 6 <sup>1</sup> / <sub>2</sub> "	10'-6"	5'-0 <sup>1</sup> / <sub>2</sub> "	6'-3"
	75	8400	10900	730	6'-2 <sup>3</sup> / <sub>4</sub> "	5'- 6 <sup>1</sup> / <sub>2</sub> "	10'-6"	5'-0 <sup>1</sup> / <sub>2</sub> "	6'-3"
60	25	3000	3900	335	4'-7 <sup>3</sup> / <sub>8</sub> "	4'- 3 <sup>1</sup> / <sub>4</sub> "	8'-1 <sup>3</sup> / <sub>8</sub> "	3'-6 <sup>1</sup> / <sub>2</sub> "	5'-6 <sup>7</sup> / <sub>8</sub> "
	35	3200	4200	320	4'-7 <sup>3</sup> / <sub>8</sub> "	4'- 3 <sup>1</sup> / <sub>4</sub> "	8'-1 <sup>3</sup> / <sub>8</sub> "	3'-6 <sup>1</sup> / <sub>2</sub> "	5'-6 <sup>7</sup> / <sub>8</sub> "
	50	4500	5900	525	5'-3 <sup>5</sup> / <sub>16</sub> "	4'-11 <sup>5</sup> / <sub>8</sub> "	9'-3"	4'-4 <sup>1</sup> / <sub>2</sub> "	5'-9 <sup>5</sup> / <sub>8</sub> "
	75	5700	7400	700	5'-9 <sup>3</sup> / <sub>4</sub> "	5'- 3 <sup>3</sup> / <sub>4</sub> "	10'-1 <sup>5</sup> / <sub>16</sub> "	4'-9"	6'-3 <sup>3</sup> / <sub>8</sub> "

\*Oil weighs approximately  $7\frac{1}{2}$  pounds per gallon.

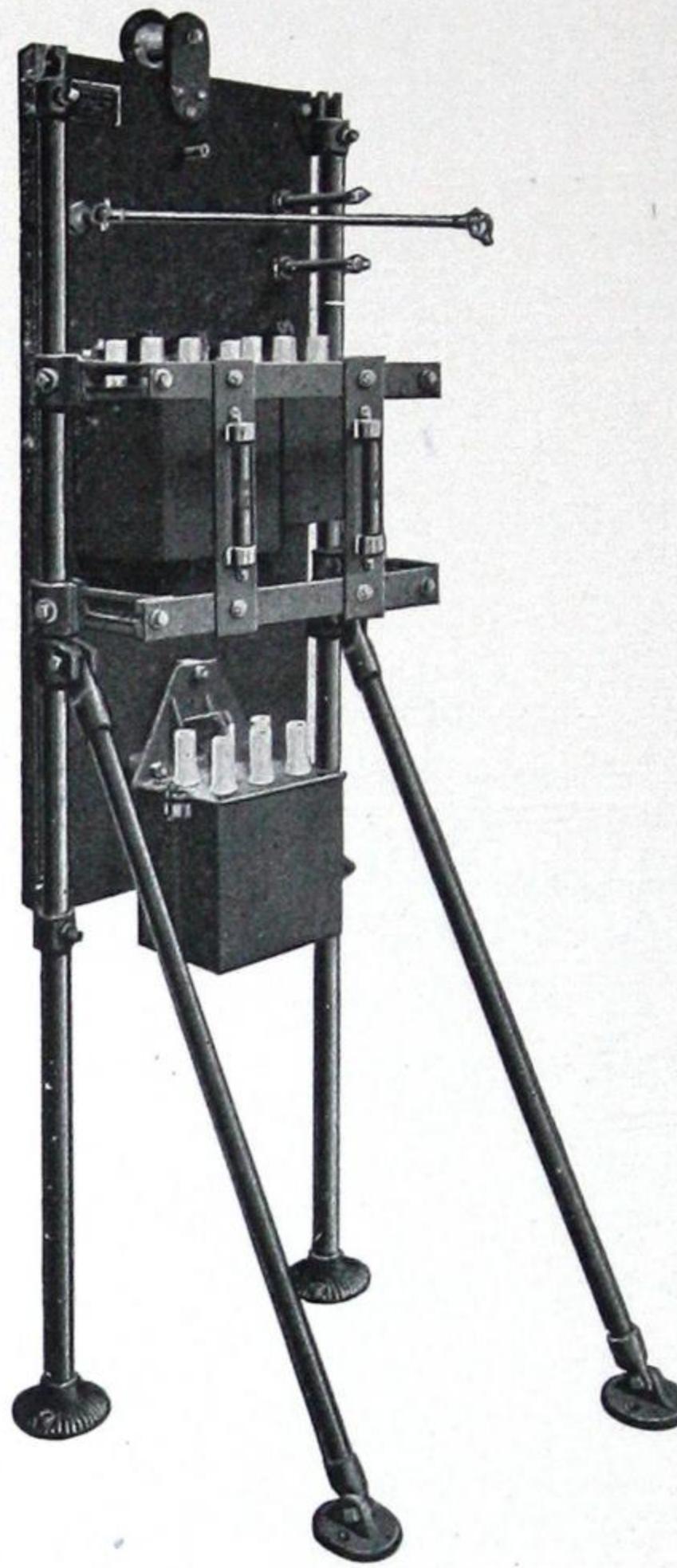
\*Oil weighs approximately 7 1/2 pounds per gallon.

NOTE—The above dimensions are for reference only. For official dimensions apply to the nearest district office of this Company.

## CONTROL PANELS FOR COOPER HEWITT RECTIFIER CONSTANT-CURRENT REGULATING TRANSFORMERS—(DS779)



FRONT VIEW OF 75-LIGHT PANEL



REAR VIEW OF 75-LIGHT PANEL

**Application**—The panels described and listed in this section are designed for use in connection with Westinghouse constant-current regulating transformers fed from single-phase alternating-current circuits through Cooper Hewitt rectifiers, and controlling series lighting circuits on which are used Westinghouse direct-current metallic-flame or carbon enclosed arc lamps.

The direct-current series metallic-flame arc lamps and constant-current Cooper Hewitt rectifiers are described elsewhere in this catalogue.

**Capacity**—These panels are designed for the control of circuits having direct-current series arc lamps. Two complete lines of panels are listed, one for 25, 35, 50, 75, and 100 4-ampere lamps, and one for 25, 35, 50, and 75 6.6-ampere lamps. The panels may be used on circuits of any frequency.

Standard nominal primary voltages are 220, 440, 1100, 2200, 6600.

**Special Panels**—Panels for capacities or voltages other than those given can be built and prices and detailed information will be furnished on request.

It is strongly recommended, however, that stand-

ard panels be ordered whenever possible, as special panels involve delay in shipment and increase in price.

**Characteristics**—The distinguishing features of this type of panel are the tubular iron frame and oil switches controlling both the constant-potential and the constant-current circuits.

### Construction

The panel consists of a single slab of marble having the apparatus mounted thereon, bolted to a tubular iron frame which is, in turn, bolted to the floor.

**Marble**—The marble slab is of black marine finish, 48 inches high,  $1\frac{1}{2}$  inches thick, with the front edges beveled  $\frac{3}{8}$ -inch. It is bolted at the four corners to lugs on the frame. The switches and meters are mounted directly on the marble.

**Frame**—The type J frame is supplied with these panels. This frame is made from  $1\frac{1}{4}$ -inch gas pipe uprights which are screwed into foot-nuts adapted for bolting to the floor. Each upright is supplied with a gas-pipe rod and foot-nut for bracing the panel to the floor or to the wall, as may be desired.

## CONTROL PANELS FOR RECTIFIER C. C. REGULATING TRANSFORMERS—(DS779)—Continued

The total height of the panel from the floor is 6 feet 4  $\frac{3}{8}$  inches.

**Mounting**—The panel is generally mounted directly in front of the apparatus that it controls but may be lined up with and form a part of the main station switchboard if desired.

**Arrangement of Apparatus**—The apparatus is mounted on the panel in such a manner that it is impossible for the operator, when in front of the board, to come in contact with any of the live parts. This feature renders the panel particularly adaptable for the control of high-voltage circuits.

**Finish**—The standard finish of the marble and all parts on the front of the board is black marine. The finish of all frame parts is a dull black that affords protection from rust.

**Connections**—The connections on the rear of the panels are made with flame-proof wire. Each panel is erected at the Works before shipment and it is only necessary to complete the connections at the installation. A wiring diagram showing the manner in which the connections are to be completed is furnished with each switchboard.

**Instruments**—On circuits of 50 lamps or less, a type SL ammeter insulated for a maximum working voltage of 4000 is furnished. Higher voltage circuits use the type TL ammeter insulated for a maximum working voltage of 12,000. These instruments are designed especially for direct-current series arc circuits and are connected directly in series with the line.

**Switches**—For the control of the constant potential or alternating-current side, an oil switch, either type I or type D is furnished.

For the control of the constant-current or direct-current circuits of 25, 35, and 50 lights, two double-pole type I oil switches are furnished; for the 75-light

panels, one special two-handle three pole, and one double-pole type I switches are furnished. The 4-ampere, 100-light panel is arranged to control two 50-light circuits and consequently four double-pole switches are supplied.

**Automatic Protection**—Two fuse blocks mounted on the rear and two sets of enclosed fuses are supplied with each panel. These fuses are connected in the constant-potential or alternating-current circuit.

**A tilting handle** for starting the rectifier bulb is mounted on each panel but seldom used, since the bulb, after having been in service for a short time, is self-starting. This device consists of a small handle, the shaft of which projects through the marble and is connected to the tilting mechanism on the rectifier.

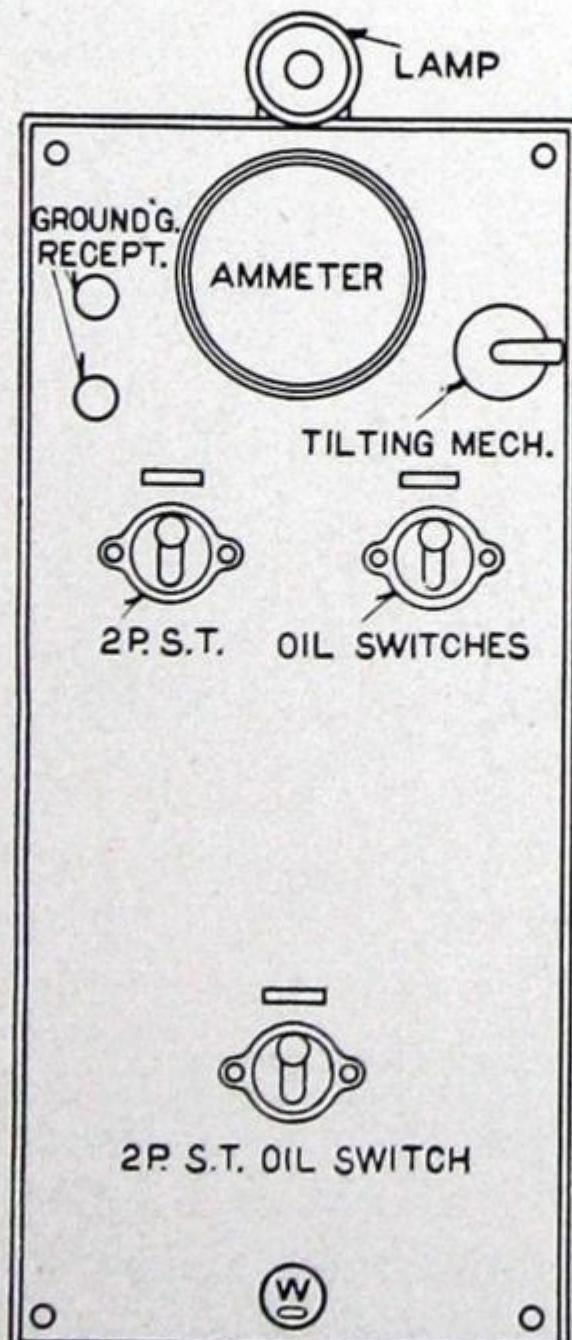
**Line Testing and Signals**—Each panel is equipped with two receptacles used to test for grounds and open circuits on the arc lines. Two plugs for use with these receptacles should be ordered for each new installation of panels.

A relay for ringing an alarm bell is also furnished with each panel. This relay, which is arranged for mounting on the wall, or other convenient support, and connected in series with the arc circuit, indicates an open circuit by ringing a bell which may be connected to it. The bell is not furnished.

An incandescent lamp mounted on a bracket at the top of the panel is connected in series with the arc circuit and serves as an indicator or pilot lamp.

**Instructions for Ordering**—When single standard panels are desired it is simply necessary to specify the style number and state if testing plugs are desired, as this gives all the information required.

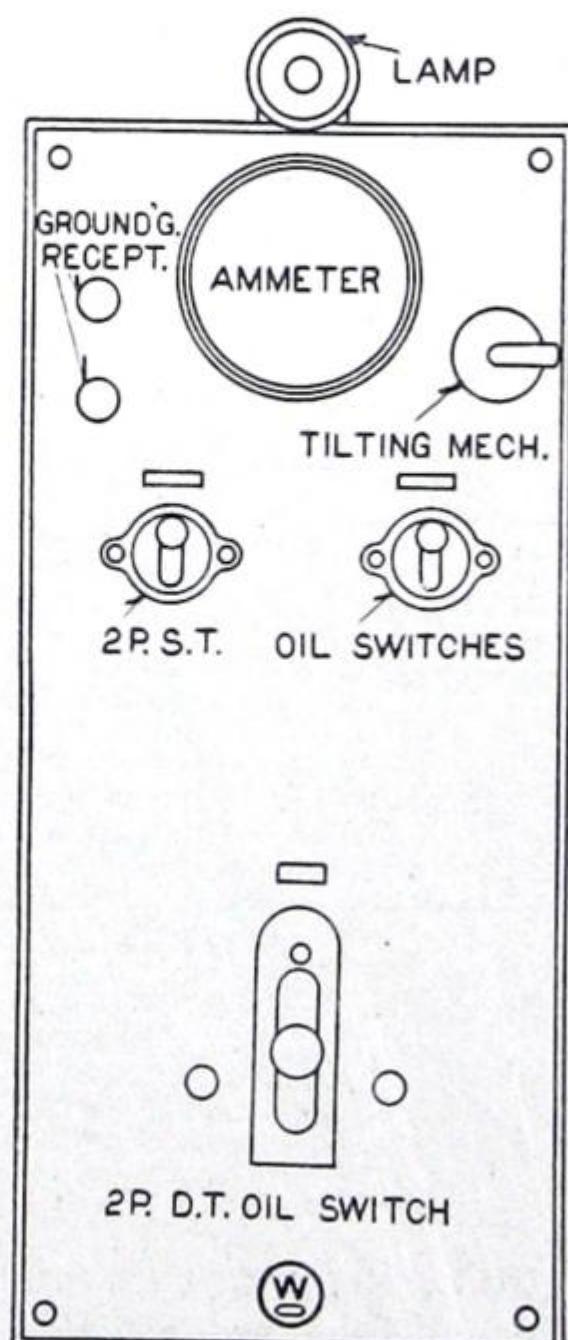
If however, the panel desired differs from the standard or there are any special conditions to be met, the order must be accomplished by a panel specification and switchboard data sheet properly filled out.



## FOR 25, 35, AND 50 ARC LAMPS

## Schedule of Apparatus

- One type SL direct-current high-tension ammeter.
- One two-pole type I oil switch for arc circuit.
- One two-pole type I switch for starting.
- One series incandescent lamp and bracket.
- One two-pole single-throw primary oil switch for constant-potential circuit.
- Two enclosed fuse blocks and fuses for constant-potential circuit.
- One tilting handle for rectifier.
- Two testing receptacles and necessary plugs.
- One bell-ringing relay.



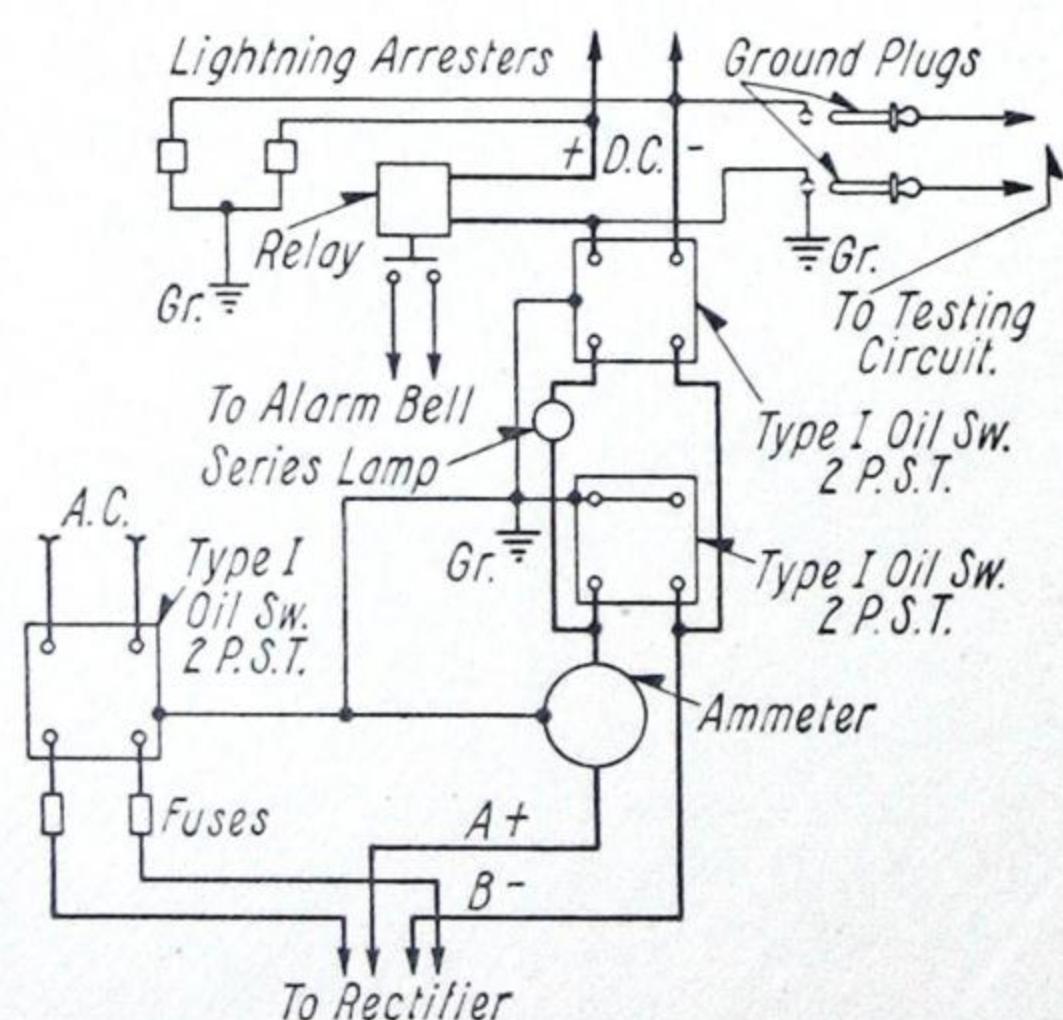
## CONTROL PANELS FOR RECTIFIER C. C. REGULATING TRANSFORMERS—(DS779)—Continued

## FOR 25, 35, AND 50 ARC LAMPS

Single-Throw				Double-Throw			
Style No.	Primary Voltage	CAPACITY IN AMPERES	Primary Oil Switch	Style No.	Primary Voltage	CAPACITY IN AMPERES	Primary Oil Switch
<b>25 4-Ampere Arc Lamps</b>							
119102	220	75	50	119126	220	75	100
119103	440	35	50	119127	440	35	100
119104	1100	15	50	119128	1100	15	100
119105	2200	10	50	119129	2200	10	100
125253	6600	3	50	119130	6600	3	100
<b>35 4-Ampere Arc Lamps</b>							
119108	220	100	100	119131	220	100	100
119109	440	50	50	119132	440	50	100
119110	1100	20	50	119133	1100	20	100
119111	2200	10	50	119134	2200	10	100
125254	6600	3	50	119135	6600	3	100
<b>50 4-Ampere Arc Lamps</b>							
119114	220	150	100	119136	220	150	100
119115	440	75	50	119137	440	75	100
119116	1100	30	50	119138	1100	30	100
119117	2200	15	50	119139	2200	15	100
125255	6600	5	50	119140	6600	5	100
<b>25 6.6-Ampere Arc Lamps</b>							
144549	220	125	100	144575	220	125	100
144550	440	60	50	144576	440	60	100
144551	1100	25	50	144577	1100	26	100
144552	2200	15	50	144578	2200	15	100
144553	6600	5	50	144579	6600	5	100
<b>35 6.6-Ampere Arc Lamps</b>							
144554	220	175	200	144580	220	175	200
144555	440	85	100	144581	440	85	100
144556	1100	30	50	144582	1100	30	100
144557	2200	20	50	144583	2200	20	100
144558	6600	6	50	144584	6600	6	100
<b>50 6.6-Ampere Arc Lamps</b>							
144559	220	250	200	144585	220	250	200
144560	440	125	100	144586	440	125	100
144561	1100	50	50	144587	1100	50	100
144551	2200	25	50	144577	2200	25	100
144562	6600	10	50	144588	6600	10	100

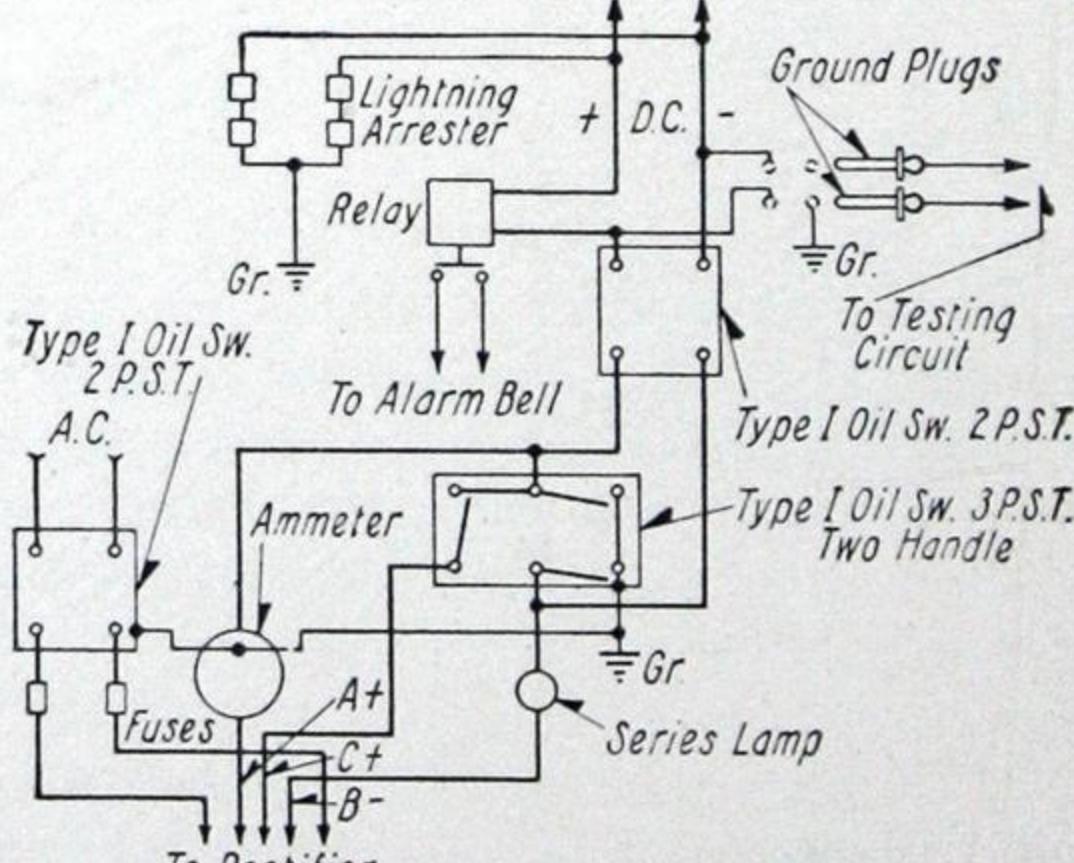
Information regarding panels for 13,200-volt service furnished upon request.

Approximate shipping weight, 700 pounds.



Connect leads to rectifier as per rectifier diagram.  
Connect lead A to terminal A and lead B to terminal B on rectifier.

WIRING DIAGRAM FOR 25, 35, AND 50-LIGHT SINGLE CIRCUIT MERCURY RECTIFIER SYSTEM

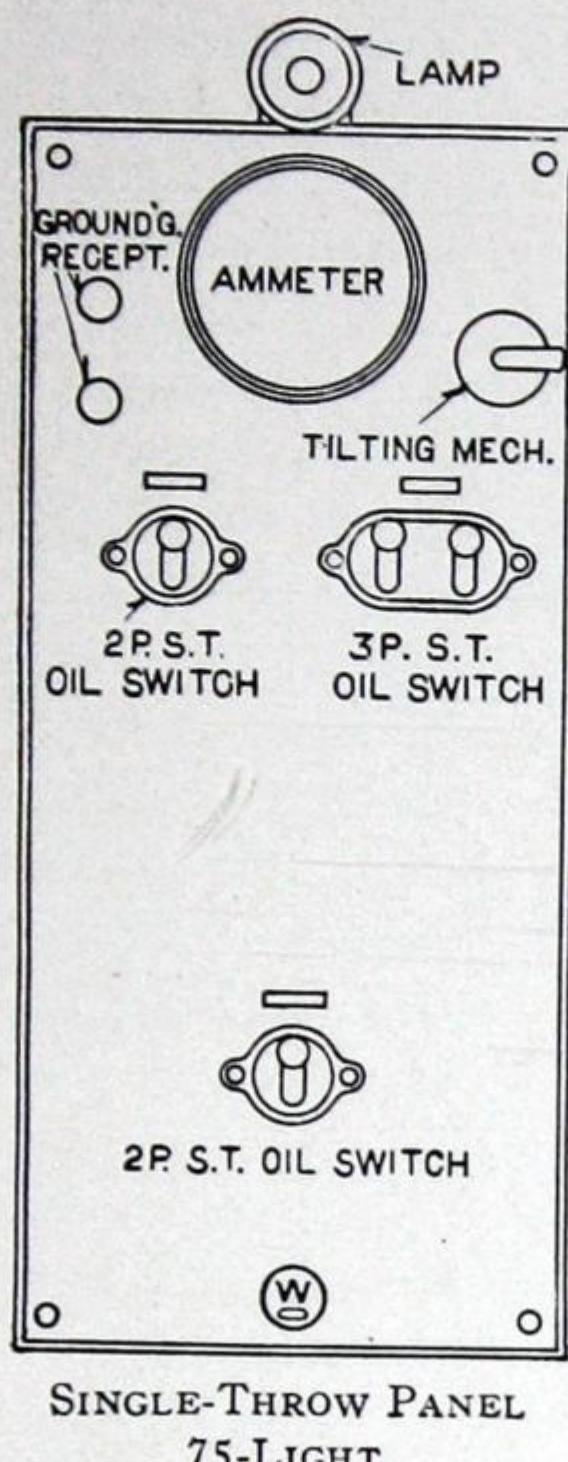
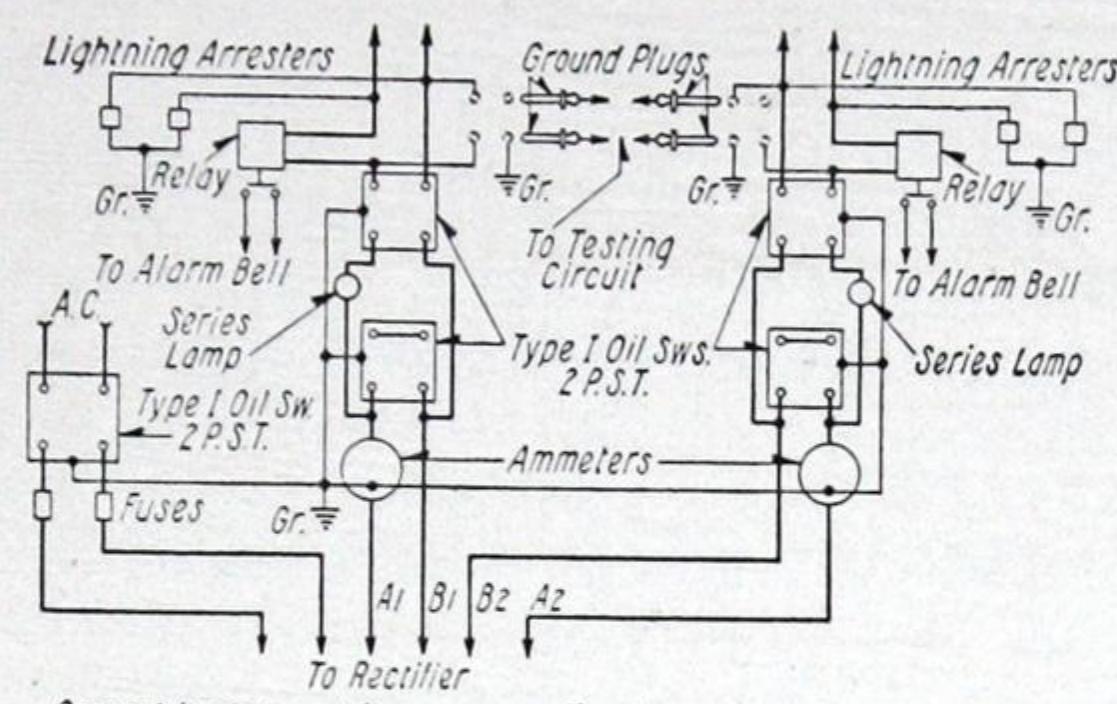
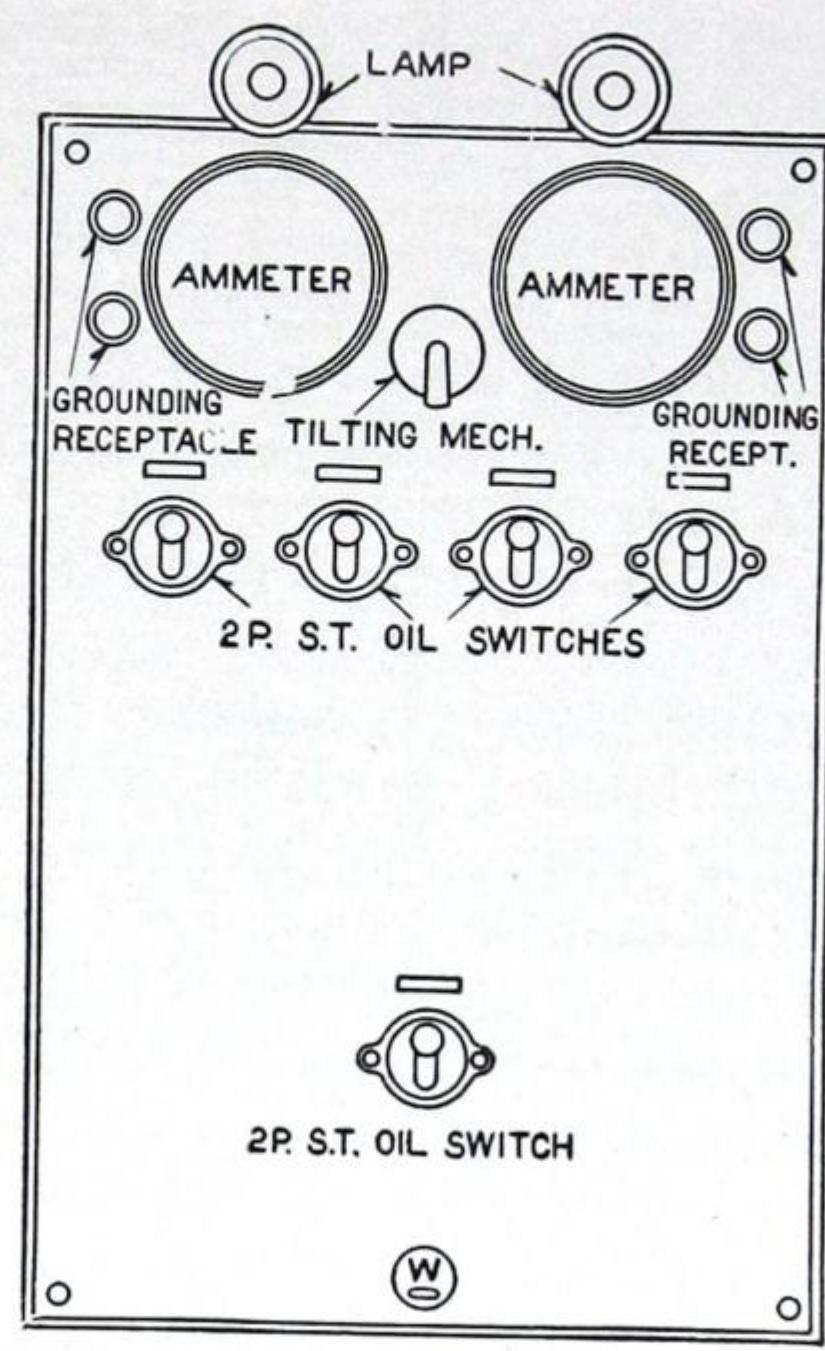


Connect leads to rectifier as per rectifier diagram.  
Connect lead A to terminal A, lead B to terminal B, and lead C to terminal C on rectifier.

WIRING DIAGRAM FOR 75-LIGHT SINGLE CIRCUIT MERCURY RECTIFIER SYSTEM

## CONTROL PANELS FOR RECTIFIER C. C. REGULATING TRANSFORMERS—(DS779)—Continued

## FOR 75 AND 100 ARC LAMPS

SINGLE-THROW PANEL  
75-LIGHTWIRING DIAGRAM FOR 100-LIGHT TWO-CIRCUIT  
MERCURY RECTIFIER SYSTEMSINGLE-THROW  
100-LIGHT

## Schedule of Apparatus

75-Light	100-Light	
1	2	Type SL (Type TL for 75-light) direct-current high-tension ammeters.
1	2	Two-pole type I oil switches for arc circuits.
1	..	Three-pole two-handle special type I oil switches for starting.
..	2	Two-pole type I oil switches for starting.
1	2	Series incandescent lamps and brackets.
*1	*1	Two-pole single-throw primary oil switch for constant-potential circuit.
2	2	Enclosed fuse blocks and fuses for constant-potential circuit.
1	1	Tilting handle for rectifier.
2	4	Testing receptacles and necessary plugs.
1	2	Bell-ringing relays.

\*On double-throw panels the primary oil switch is double-throw.

## Single-Throw

Style No.	Primary Voltage	CAPACITY IN AMPERES		Style No.	Primary Voltage	CAPACITY IN AMPERES	
		Fuses	Primary Oil Switch			Fuses	Primary Oil Switch

## 75 4-Ampere Arc Lamps

119120	220	200	200	119141	220	200	200
119121	440	100	100	119142	440	100	100
119122	1100	40	50	119143	1100	40	100
119123	2200	20	50	119144	2200	20	100
125256	6600	7	50	119145	6600	7	100

## 75 6.6-Ampere Arc Lamps

144563	220	350	300	144589	220	350	300
144567	4400	175	200	144590	440	175	200
144568	1100	70	50	144591	1100	70	100
144569	2200	30	50	144592	2200	30	100
144570	6600	15	50	144593	6600	15	100

Prices on Request

## 100 4-Ampere Arc Lamps

## In Two Circuits of 50 Lamps Each

144308	440	150	100	144312	440	150	100
144309	1100	60	50	144313	1100	60	100
144310	2200	30	50	144314	2200	30	100
144311	6600	10	50	144315	6600	10	100

Information regarding panels for 13,200-volt service furnished upon request.

Approximate shipping weight, 700 pounds.

## ARC LAMP ACCESSORIES—(DS772)

The globes, bulbs, reflectors and other sundries listed in this section are especially designed for use with the arc lamps manufactured by the Westinghouse Electric & Manufacturing Company. The variety of designs listed enables the user to select that design which suits his particular conditions of service, there being a design suited to any one of the services for which the arc lamps may be used.

A variety of grades of glassware is listed in order to enable the user to select that grade best suited to his uses.

**Clear glass** is recommended where the high intrinsic brilliancy is not objectionable, as it gives the highest illuminating efficiency. It can be used satisfactorily with most street-lighting systems and with interior lighting where the lamps are hung high.

**Opal glass** absorbs some of the superfluous violet rays of the light without seriously decreasing the illuminating efficiency. Globes of this glass eliminate to a considerable extent the glare which accompanies the clear glass, producing a pleasant, diffused light well adapted to street and interior lighting. This glass is distinguished by a pure milky color running evenly throughout its thickness.

**Alabaster glass** is composed of a thin film of opal glass overlaid with a clear glass. This reduces the illuminating efficiency somewhat, but the quality of light is much improved. Globes of this glass are recommended for use where a soft mellow light is desired. The globe acts as a secondary source of light, appearing pearl white of low intrinsic brilliancy. There is an entire absence of glare and shadows.

**Opalescent glass** is a similar grade to alabaster.

**Alba glass** is a crystal base uniformly permeated with innumerable minute, opaque, white particles. These deflect transmitted light rays into myriads of paths, producing a very even diffusion of light throughout the entire volume of glass. Alba globes have good diffusion and small absorption. They soften the light with a comparatively small loss and do not cause the distortion of the true color of the light source.

When used as a reflector, alba glass transmits enough light for excellent ceiling illumination, but deflects the larger proportion below the horizontal.

**Marbo glass** is a semi-opaque glass with diffusing properties. While not so efficient as clear glass, it gives a softer light, practically free from glare.

GLASSWARE  
Prices on Request

Used with Lamp Style No.	Style No. Glassware	Description	Fig. No.	Net Each	Shipping Per Package	Used with Lamp Style No.	Style No. Glassware	Description	Fig. No.	Net Each	Shipping Per Package
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## FOR WESTINGHOUSE ENCLOSED CARBON ARC LAMPS

## Alternating-Current Series

## Outer Globes

30062	27034	Clear	1	5	115
36000	30059	Opal	1	5	115
36001	30060	Light, alabaster	1	5	115
50403-A	38919	Clear, open b't'm	2	3 $\frac{1}{2}$	115
50404-A					

## Inner Bulbs

36000	35286-A	Clear	14	$\frac{11}{16}$	60
36001	35287-A	Opalescent	14	$\frac{11}{16}$	60
36002					
36003					
50403-A					
50404-A					
50405-A					
50406-A					

30062	27035	Clear	13	$\frac{11}{16}$	60
30063	30061	Opalescent	13	$\frac{11}{16}$	60

## Alternating-Current Multiple

## Outer Globes

36006	37962	Clear	3	4	115
36007	40649	Opal	3	4	115
92248-A					

## Inner Bulbs

36006	35286-A	Clear	14	$\frac{11}{16}$	60
36007	35287-A	Opalescent	14	$\frac{11}{16}$	60
36045					
36046					
92248-A					
92249-A					
92250-A					
92251-A					

## Direct-Current Multiple and Series

## Outer Globes

36047	37962	Clear	3	4	115
36053	40649	Opal	3	4	115
59523					

## Inner Bulbs

36047	35289-A	Clear	15	$\frac{9}{16}$	60
36048	35290-A	Opal	15	$\frac{9}{16}$	60
36053					
36054					
59523					
59524					
59525					

## Direct-Current Multiple Series

## Outer Globes

36049	27034	Clear	1	5	115
103689	30059	Opal	1	5	115
103689	30060	Light alabaster	1	5	115

## Inner Bulbs

36049	35289-A	Clear	15	$\frac{9}{16}$	60
103689	35290-A	Opal	15	$\frac{9}{16}$	60
103691					

## Direct-Current Multiple Mill Type

## Outer Globes

85784	37962	Clear	3	4	115
104790	40649	Opal	3	4	115
104790					

## Inner Bulbs

85756	74645	Clear	16	$\frac{9}{16}$	60
85784	74646	Opalescent	16	$\frac{9}{16}$	60
104789					
104790					

## Manhattan Type

## Outer Globes

601, 601-A	301	Clear	4	4	115
602, 602-A	301	Alabaster	4	4	115
603, 603-A					
653, 653-A					

## Inner Bulbs

601, 601-A	12	Clear	17	$\frac{9}{16}$	60
602, 602-A	12	Alabaster	17	$\frac{9}{16}$	60
603, 603-A					
653, 653-A					

## ARC LAMP ACCESSORIES—(DS772)—Continued

## GLASSWARE—(Continued)

## Prices on Request

Used with Lamp Style No.	Style No. Glassware	Description	Fig. No.	Net Each	Shipping Per Package	Used with Lamp Style No.	Style No. Glassware	Description	Fig. No.	Net Each	Shipping Per Package
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## FOR WESTINGHOUSE FLAME-CARBON ARC LAMPS

## Westinghouse-Stave Type (Single-Globes)

169257-A						193941					
169258	{ 162221	Clear	9	2½	80	198734					
169338-A	{ 162222	Slightly opalescent	9	2½	80	198735					
169465-A	{ 170060	Alba	9	2½	80	201858					
169581						210612					
173158											

## Types H and O Lamps

## Outer Globes

## Type H

183580-A						183580-A					
183583-A	{ 185918-A	Spherical, clear	10	5½	135	185697-A					
183584-A	{ 185919-A	Spherical, slightly				189020-A					
183585-A		opalescent	10	5½	135	189025-A					
183586-A	{ 185920-A	Spherical, alba	10	5½	135	189628-A					
183589-A	{ 185921-A	Spherical, marbo	10	5½	135	189629-A					
185697-A	{ 186320-A	Acorn type, clear	11	5½	135	193673-A					
189020-A	{ 186321-A	Acorn type, slightly	11	5½	135	190003-A					
189925-A		opalescent	11	5½	135	191103-A					
189628-A	{ 186322-A	Acorn type, alba	11	5½	135	193941-A					
189629-A	{ 186323-A	Acorn type, marbo	11	5¼	135	195807-A					
190003-A						195916-A					
191103-A						198734					
193673-A						198735					
195807-A						201858					
195916-A						210612					
217636						217641					
217637						221090					
217638						221133					
217639						221134					
217640						221135					
219430						221136					
219431											
221086											
221087											
221088											
221089											
221090											
221133											
221134											
221135											
221136											

## Outer Globes (Continued)

## Type O (Pillar Type)

196345	Clear	12	10	125
196343	Alba	12	10	125
196347	Opalescent	12	10	125
196348	Marbo	12	10	125

Inner Globes  
Types H and O

183583-A						183583-A					
183584-A						183584-A					
183585-A						183585-A					
183586-A						183586-A					
183589-A						183589-A					
217636						217636					
217637						217637					
217638						217638					
217639						217639					
217640						217640					
219430						219430					
219431						219431					
221086						221086					
221087						221087					
221088						221088					
221089						221089					
221090						221090					
221133						221133					
221134						221134					
221135						221135					
221136						221136					

## FOR WESTINGHOUSE METALLIC FLAME ARC LAMPS

## Globes

Type A				Type B			
66095	Clear	5	3¾	60	126199-A		
200522	Clear with hole in bottom	5	3¾	60	126200-A		
142760	Alba	5	3¾	60	133411	Clear, reflecting	6
Type C				142081	Alba	7	3
							100
				162497-A	Clear	8	4½
				162498-A	Alba	8	4½
				202877		110	
				202879			110

## FOR LUXSOLITE FIXTURES

## Globes

## Holophane Refractors

220841				225351			
220842	{ 220258	Clear	20	3½			

## ARC LAMP ACCESSORIES—(DS772)—Continued

## OUTLINE DIMENSIONS

## Outer Globes

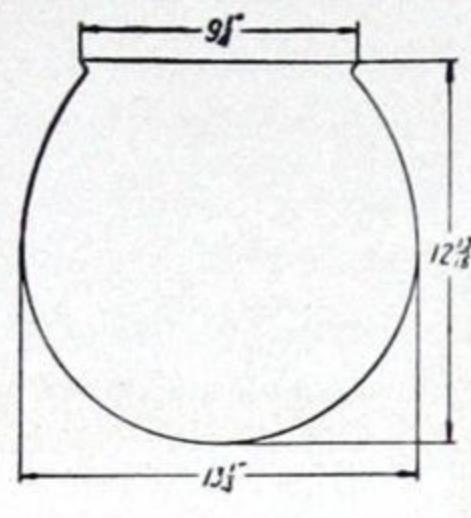


FIG. 1

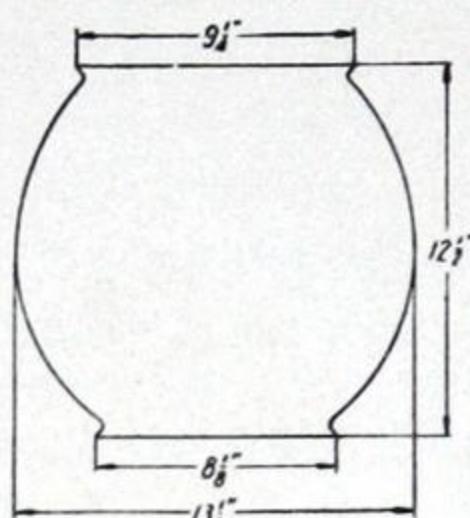


FIG. 2

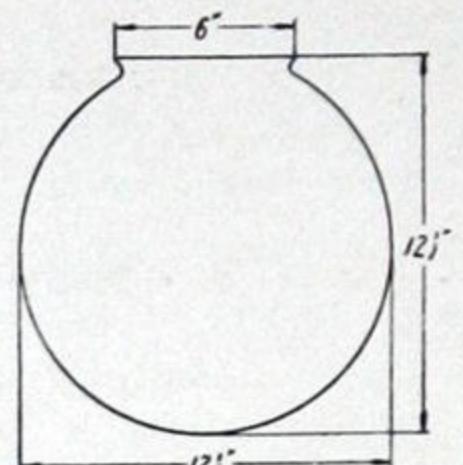


FIG. 3

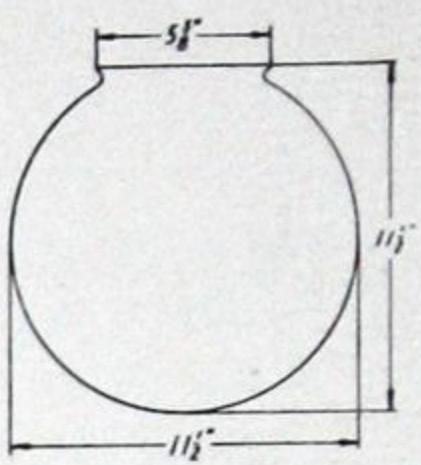


FIG. 4

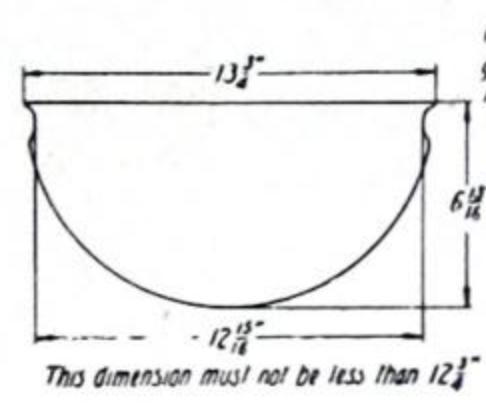


FIG. 5

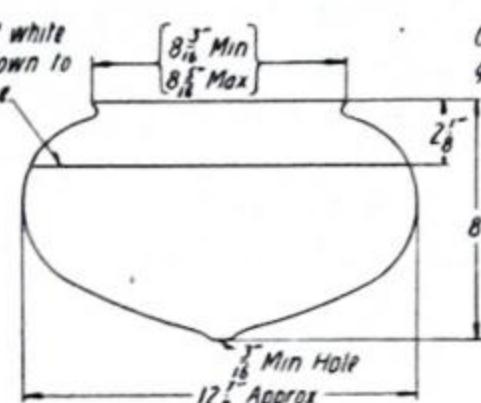


FIG. 6

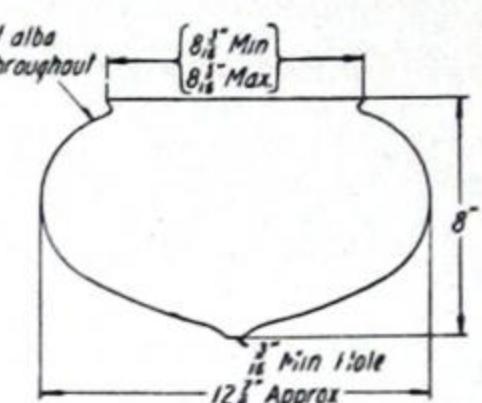


FIG. 7

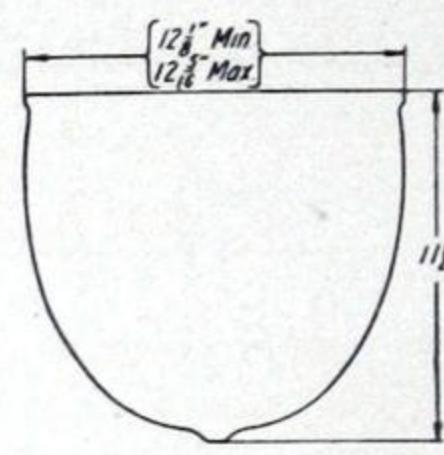


FIG. 8

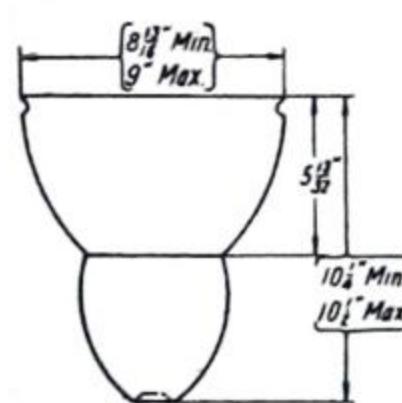


FIG. 9

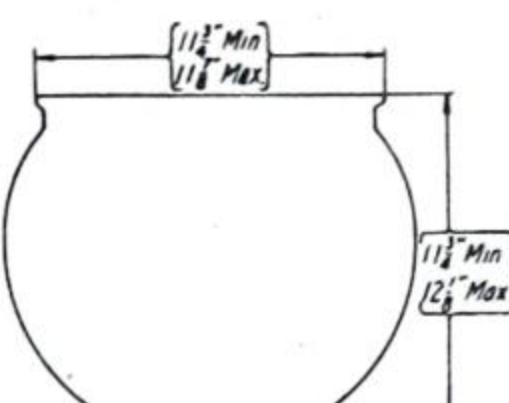


FIG. 10

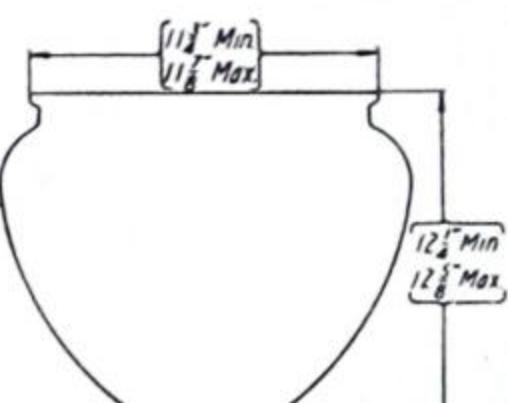


FIG. 11

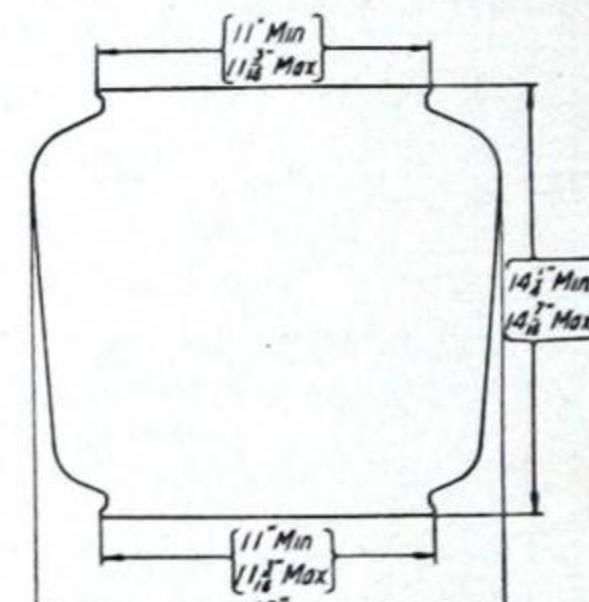


FIG. 12

## Inner Bulbs

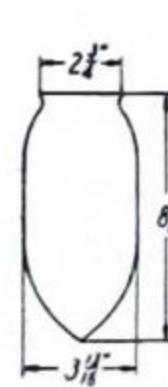


FIG. 13

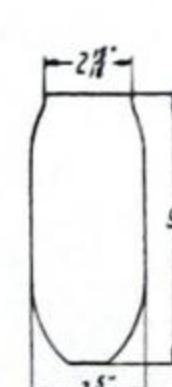


FIG. 14

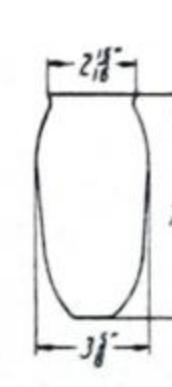


FIG. 15

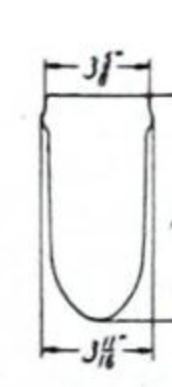


FIG. 16



FIG. 17

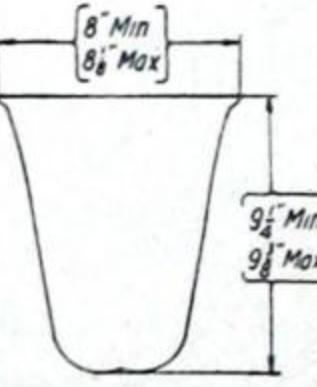


FIG. 18

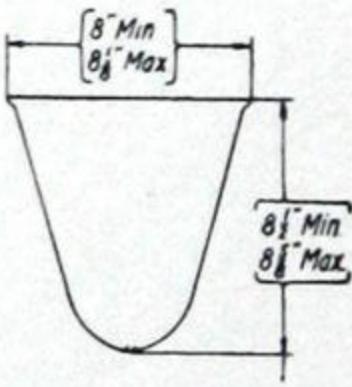


FIG. 19

## Luxsolite Globe and Refractor

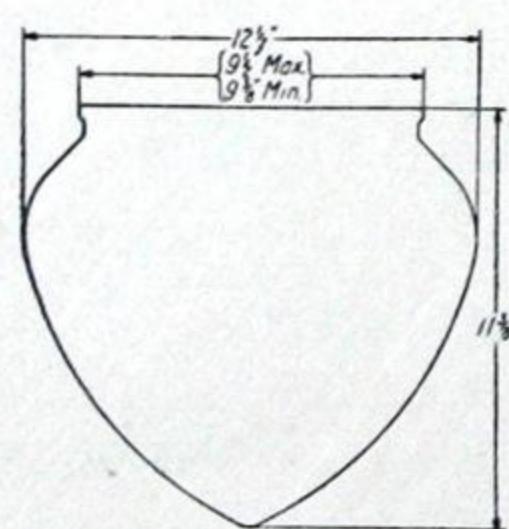


FIG. 20

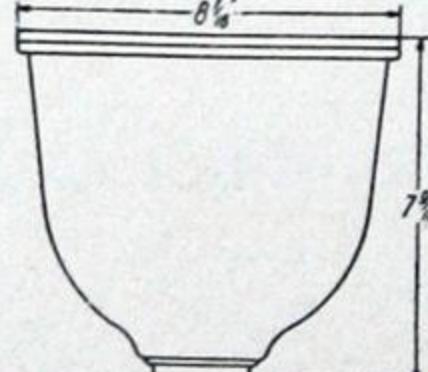


FIG. 21

These dimensions are for reference only. For official dimensions apply to nearest district office.

## ARC LAMP ACCESSORIES—(DS772)—Continued

## CARBONS

## For Westinghouse Enclosed Arc Lamps

Columbia carbons are carried in stock. In ordering state the diameter and length of carbon with description, i. e., cored or solid. Prices on request.

## For Westinghouse Flame-Carbon Arc Lamps

Columbia carbons are carried in stock. In ordering be sure to state **style number** of lamp, **size**, of carbons, **color** of light and whether for alternating-current or direct-current lamps. Prices on request.

## ELECTRODES

## For Westinghouse Metallic Flame Series

## Arc Lamps

Prices on request



UPPER OR NEGATIVE

Upper or Negative				Shipping Weight, Lbs. Per 1000
Style No.	Length	Amperes of Circuit		
146648	12"	4		
146649	16"	4		
145368	16"	6.6		550

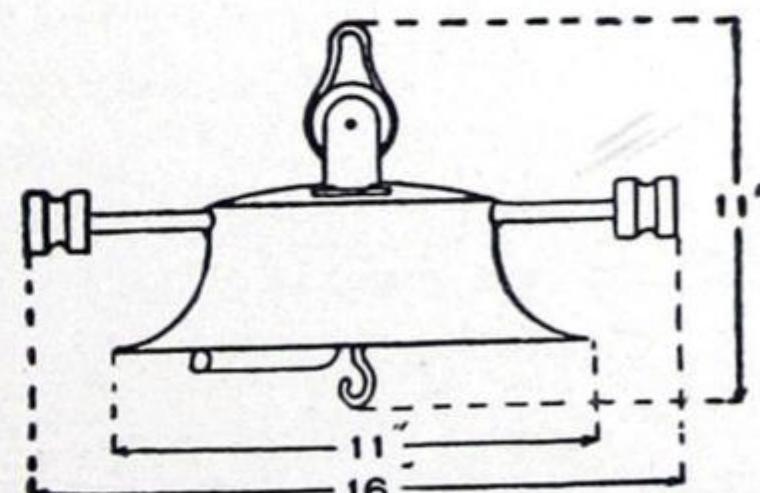
Lower or Positive				Shipping Weight, Lbs. Per 1000
Style No.	Length	Amperes of Circuit		
92721	...	4		
127909	...	6.6		85



## MAGNESIA CONSUMERS

## For Westinghouse-Stave and Type H Flame-Carbon Arc Lamps

Style No. 177455-B consists of one set of magnesia consumer material made up in a wire gauze holder ready for insertion in any of the Westinghouse-Stave or type H flame-carbon arc lamps. Price on request.



STYLE No. 35297  
Weight, 17 pounds, net.  
Weight, 35 pounds, packed

## BRUSHES



STYLE No. 187299



STYLE No. 57968



STYLE No. 104162

Style No.	Description
57968	Inner globe brush.
104162	Chimney tube brush for metallic flame lamp
187299	Condensing chamber brush for flame-carbon lamp

Prices on request

## CONTAINER BOX FOR HIGH-TENSION RECTIFIER BULB

Style number of bulb box does not cover lifting strap which should be ordered as follows:

Style No.	Description
156452	Container box complete except lifting strap.

Lifting Straps	
Rating of Rectifier	
25-light, 4-amp., 60-cycle	
35-light, 4-amp., 60-cycle	
50-light, 4-amp., 60-cycle	
25-light, 4-amp., 25-cycle	
25-light, 6.6-amp., 60-cycle	
35-light, 6.6-amp., 60-cycle	
75-light, 4-amp., 60-cycle	
35-light, 4-amp., 25-cycle	
50-light, 4-amp., 25-cycle	
50-light, 6.6-amp., 60-cycle	
75-light, 4-amp., 25-cycle	
75-light, 6.6-amp., 60-cycle	
50-light, 6.6-amp., 25-cycle	
75-light, 6.6-amp., 25-cycle	
100-light, 4-amp., 60-cycle	
100-light, 6.6-amp., 60-cycle	

Prices on request

## ABSOLUTE CUT-OUT ARC LAMP HANGERS

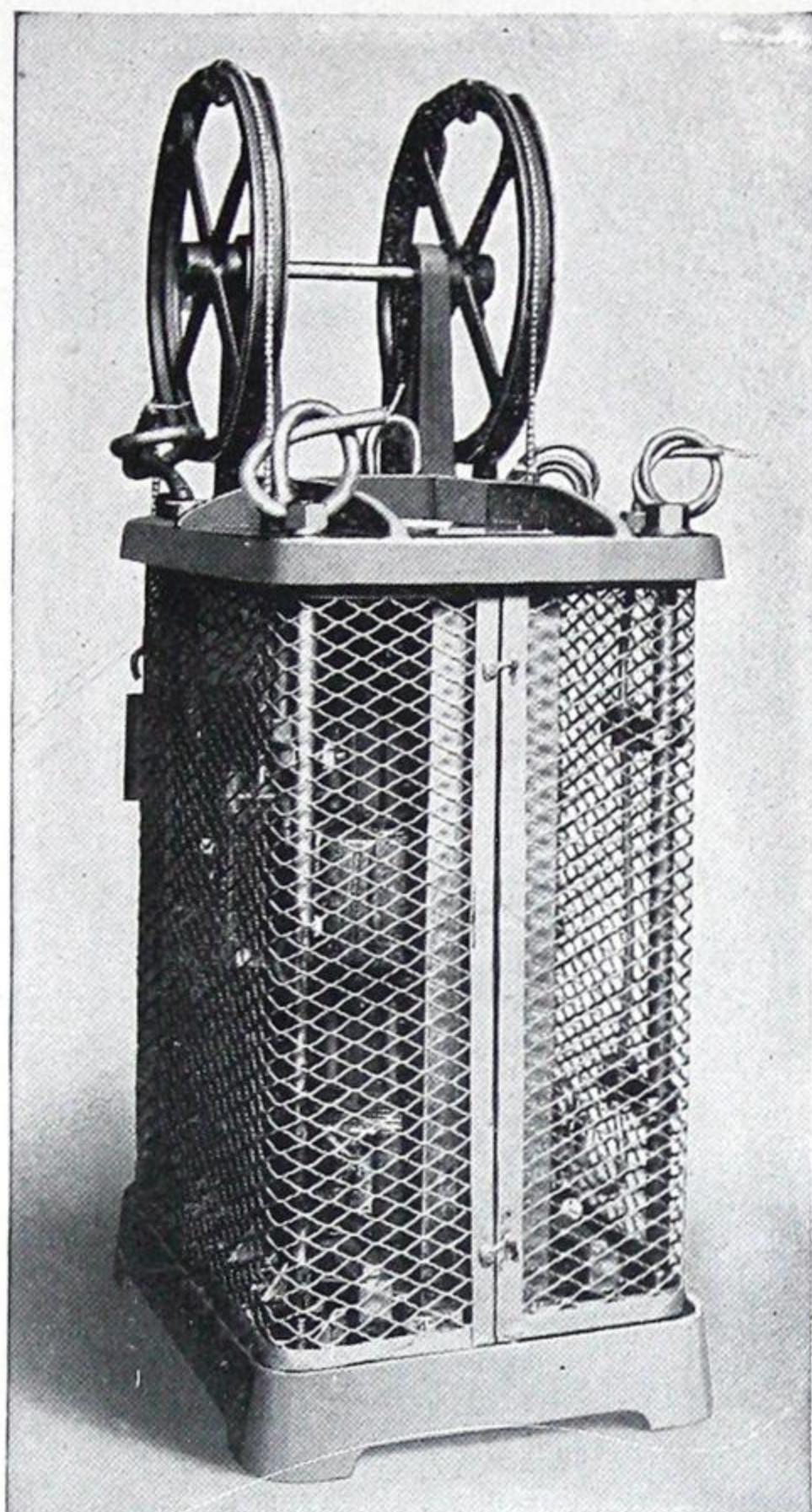
## For A. C. and D. C. Series Lamps

Price on request

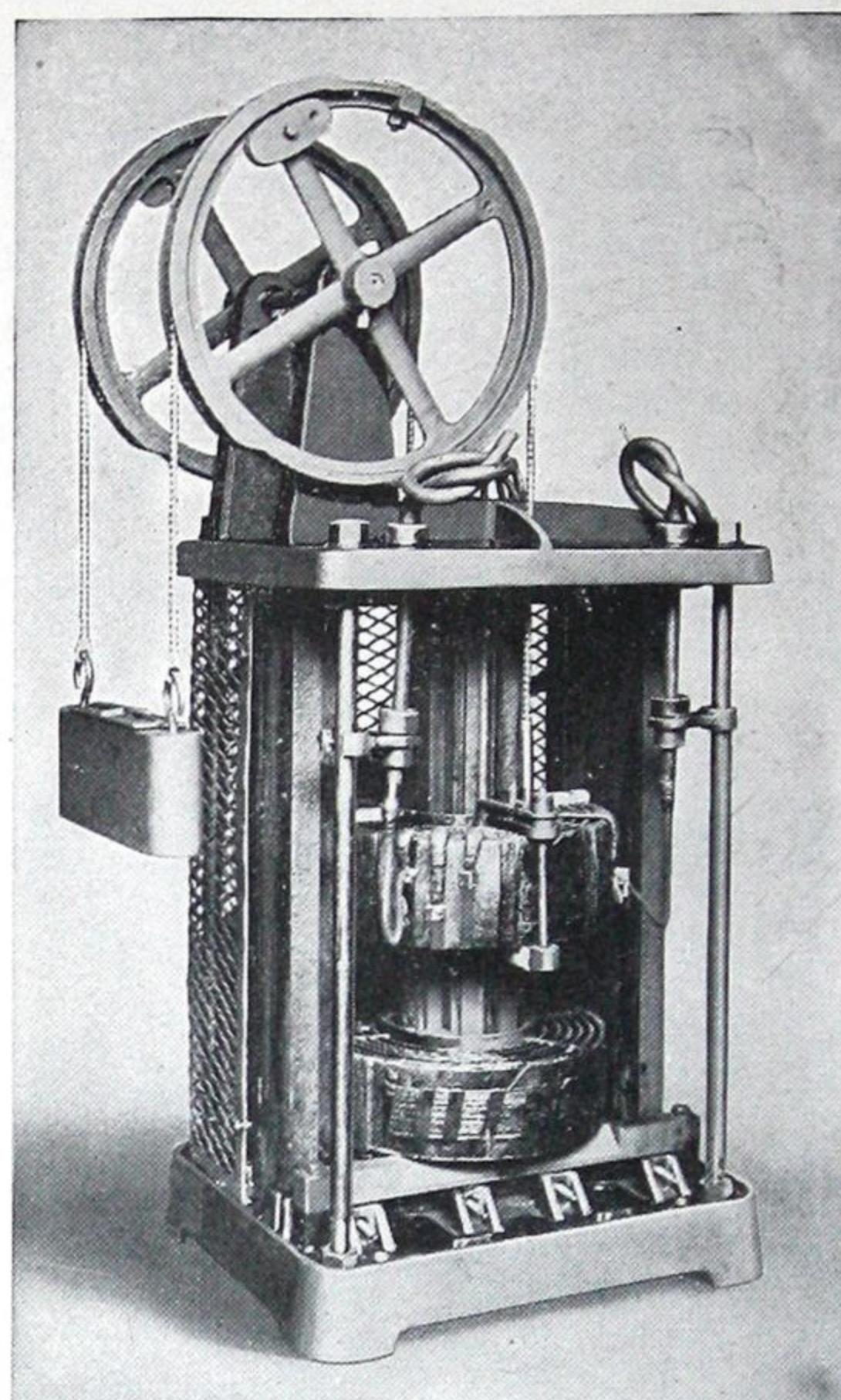


STYLE No. 35297

## MOVING COIL REGULATING TRANSFORMERS AND CONTROL PANELS—(DS783)



Complete



With One-Half of Cover Removed

MOVING COIL REGULATING TRANSFORMER, 17-KVA. CAPACITY, 60 CYCLES

These constant-current regulating transformers are designed to supply constant current to alternating-current series lighting systems from constant-potential alternating-current circuits.

The relative **advantages** of the constant current moving coil regulator for control of series systems, are as follows:

1. Accuracy of regulation under (a) variable load from maximum to short circuit, (b) varying primary voltage which is cared for by no other system.
2. Maximum protection from grounds and short-circuits although operating power factor is high.
3. High efficiency and power factor particularly on large sizes where this is of importance.
4. Ease of operation and possibility of time switch control in isolated stations.
5. Low first cost in large installations i. e. over 10 kilowatts.

**Enclosed carbon arc lamps** may be operated from these regulators when equipped with a dashpot, as noted in the following. A Westinghouse 6.6 or 7.5-ampere enclosed carbon arc lamp adjusted in accordance with its specification, requires .64 or .70 kva. respectively of regulator capacity for its operation.

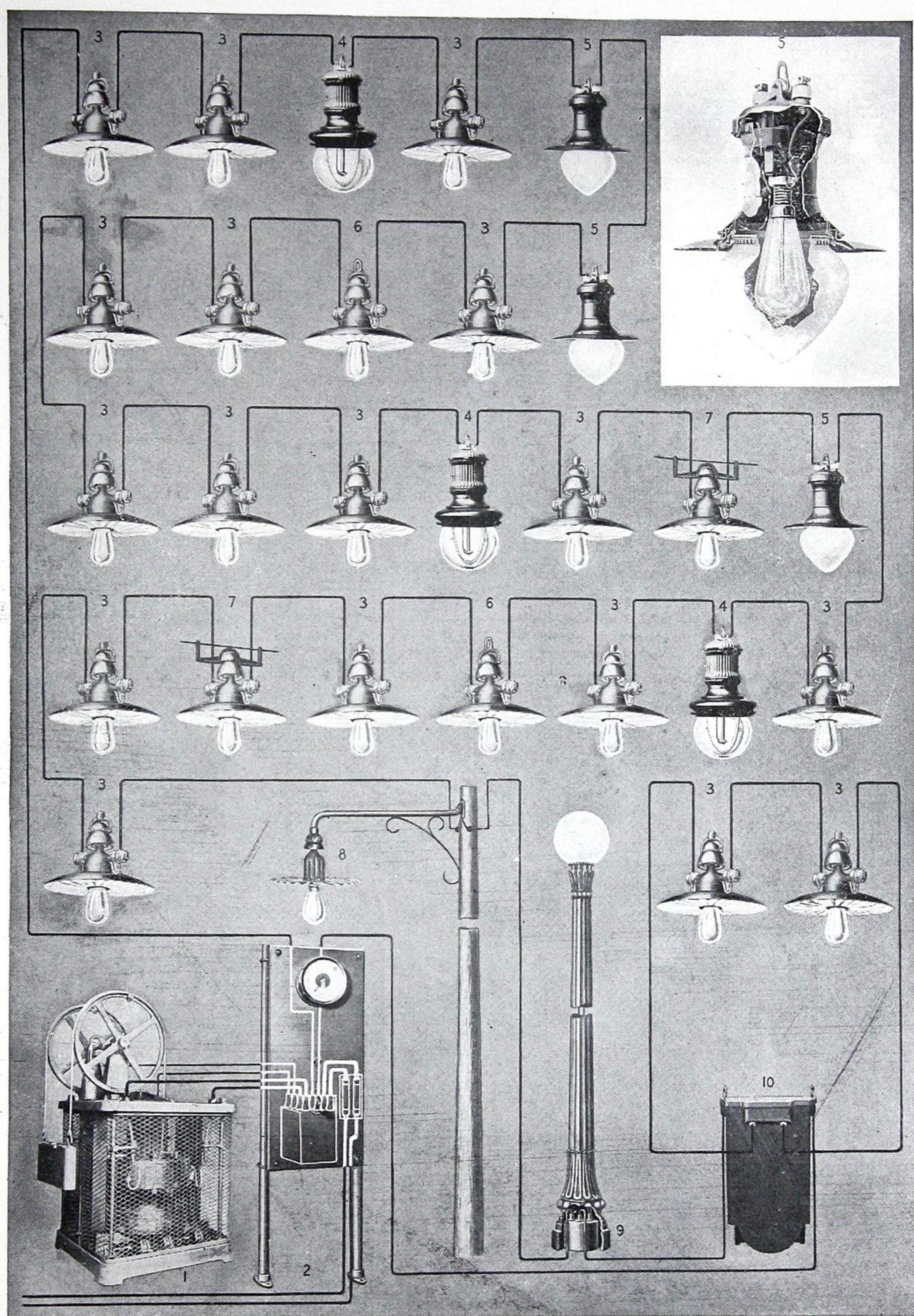
**Rating**—The standard regulators are built for

nominal 2200-volt 60 or 25-cycle circuits, and will supply a lamp load equal in kilowatts to their rated kilovolt-amperes plus a 5 per cent ohmic and 10 per cent reactive line loss.

**Operation**—The electrical repulsion which exists between primary and secondary coils of a transformer under load is applied in these regulating transformers to produce and maintain a constant current in the secondary or lamp circuit. The primary coil is stationary at the lower end of the core while the secondary coil is suspended by means of a steel chain passing over a pair of wheels and is balanced by a counterweight. It is thus free to move towards or away from the primary coil. The regulator can be adjusted to maintain its rated secondary current under the normal conditions of load, primary voltage and frequency. If a change in the number of lamps or a variation in the primary voltage tends to increase the lamp current the repulsion between the primary and secondary coils increases and the movable coil travels away from the stationary coil until the normal current is re-established.

**Efficiency**—The **efficiency** of these regulators at full load varies from 90 to 96% for the various sizes. At  $\frac{1}{2}$  load these efficiencies are from 68 to 86%, being highest with the larger regulators. The **power**

## MOVING COIL REGULATING TRANSFORMERS AND CONTROL PANELS—(DS783)—Continued



WITH THE SAME CONSTANT-CURRENT REGULATING TRANSFORMER, A SYSTEM MAY BE ALL ARC LAMPS, ALL INCANDESCENT LAMPS, OR ANY COMBINATION OF BOTH. VARIOUS COMBINATIONS ARE SHOWN ABOVE.

1. CONSTANT CURRENT REGULATING TRANSFORMER WHICH TAKES CURRENT FROM A CONSTANT POTENTIAL CIRCUIT AND CONVERTS IT INTO CONSTANT CURRENT, GENERALLY AT 6.6 OR 7.5 AMPERES.
2. SWITCHBOARD FOR CONTROLLING MAIN CIRCUIT TO REGULATING TRANSFORMER AND FROM TRANSFORMER TO LIGHTING SYSTEM.
3. GAS FILLED LAMP STREET HOOD, TWO-PIECE REFLECTOR FOR POLE BRACKET MOUNTING.
4. TYPE "H" LONG BURNING, FLAME CARBON ARC LAMP.
5. LUXSOLITE FIXTURE WITH AUTO TRANSFORMER FOR LARGE GAS FILLED LAMP.
6. GAS FILLED LAMP STREET HOOD, ARRANGED WITH EYE FOR HOOK SUSPENSION.
7. GAS FILLED LAMP STREET HOOD ARRANGED FOR SUSPENDING ON CABLE ACROSS STREET.
8. GAS FILLED LAMP STREET HOOD, SINGLE PIECE REFLECTOR, ON POLE BRACKET.
9. GAS FILLED LAMP ON ORNAMENTAL IRON POLE, FED FROM SERIES TRANSFORMER IN BASE OF POLE TO INSURE A SAFE VOLTAGE CIRCUIT WITHIN THE POLE.
10. SAFETY COIL OR TRANSFORMER USED WHEN IT IS DESIRABLE TO OPERATE A FEW LIGHTS AT A LOW VOLTAGE SUCH AS FOR INTERIOR LIGHTING.

## MOVING COIL REGULATING TRANSFORMERS AND CONTROL PANELS—(DS783)—Continued

factor similarly varies from 82 to 88 at full load and from 50 to 55 at  $\frac{1}{2}$  load.

**Regulation**—The wheels and shaft are mounted on a pair of high-grade ball-bearings, reducing the friction to a minimum. The regulator will maintain a secondary current within 2 per cent of normal rated current.

**Windings**—The windings of these regulating transformers are known, and described as "ventilated coils." A coil consists of a number of concentric sections. The spacing strips which provide ventilating ducts between sections are placed in the coil during the process of winding, the completed coil thus being one of great rigidity and strength. For currents of 5.5 amperes and above the individual sections consist of two layers so that one side of each conductor is directly exposed to the air.

After the winding is completed the coil is dried and dipped in an insulating enamel which fills up all the pores in the insulation and gives an even black finish.

No taping whatever is used except for protection of leads. The coils are insulated from the metal parts entirely by micarta tubes made from paper treated with bakelite.

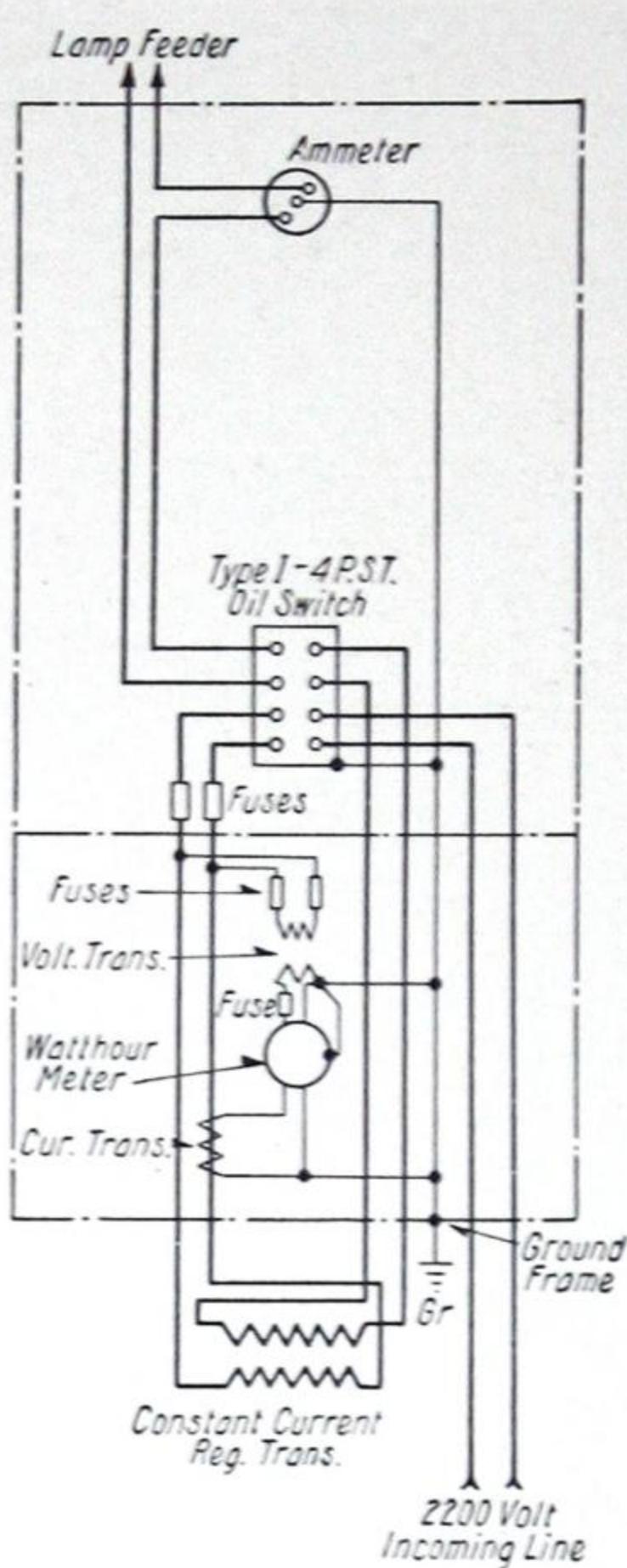


DIAGRAM OF CONNECTIONS FOR SINGLE-CIRCUIT REGULATOR AND CONTROL PANEL WITHOUT SHORT-CIRCUITING SWITCH ON SECONDARY

**Circuits**—The 14, 20, and 28-kva. 25-cycle and the 34, 50, and 68-kva. 60-cycle sizes are arranged to operate two inter-connected circuits, each circuit being loaded to approximately one-half the capacity of the regulator. All other sizes are arranged to operate a single circuit of lamps but two circuits can be operated from the single-circuit regulators by the use of a two-circuit panel.

**Primary Taps**—In the primary winding provision is made for three voltages; 2400, 2200 and 2000.

**Secondary Taps**—Taps are provided in the secondary coil for 80 and 90 per cent of full load. These taps may be used when operating at less than full load to obtain higher primary power factor. The regulators are not quite as sensitive when the secondary taps are used as when the entire winding is used.

**Adjusting Weights**—When the secondary connections are changed the counterweights must be changed also. For this purpose a number of small weights are placed within the main counterweight and may be removed or added to as required.

**Frames**—These regulating transformers are mounted in substantial

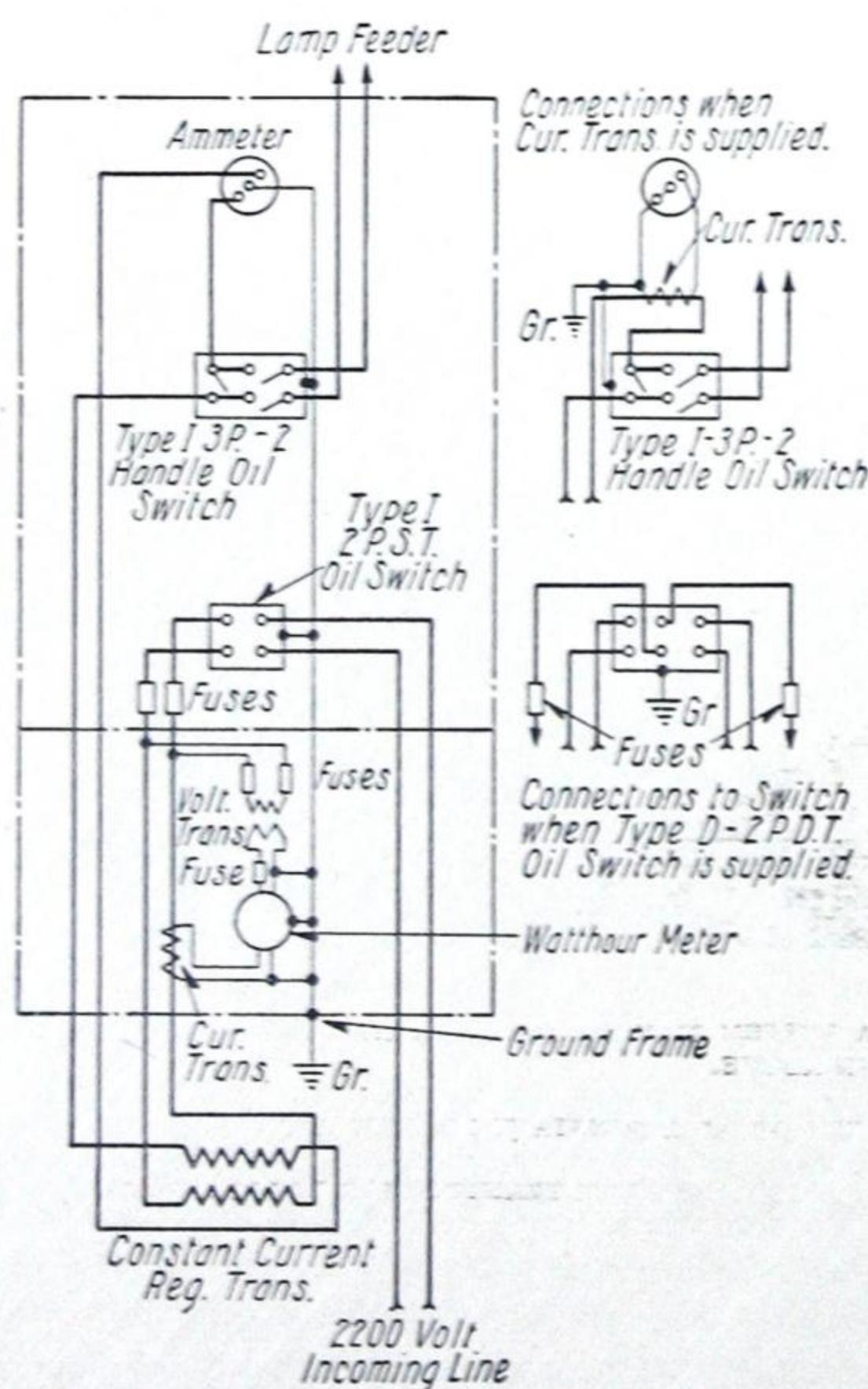


DIAGRAM OF CONNECTIONS FOR SINGLE-CIRCUIT REGULATOR AND CONTROL PANEL WITH SHORT-CIRCUITING SWITCH ON SECONDARY

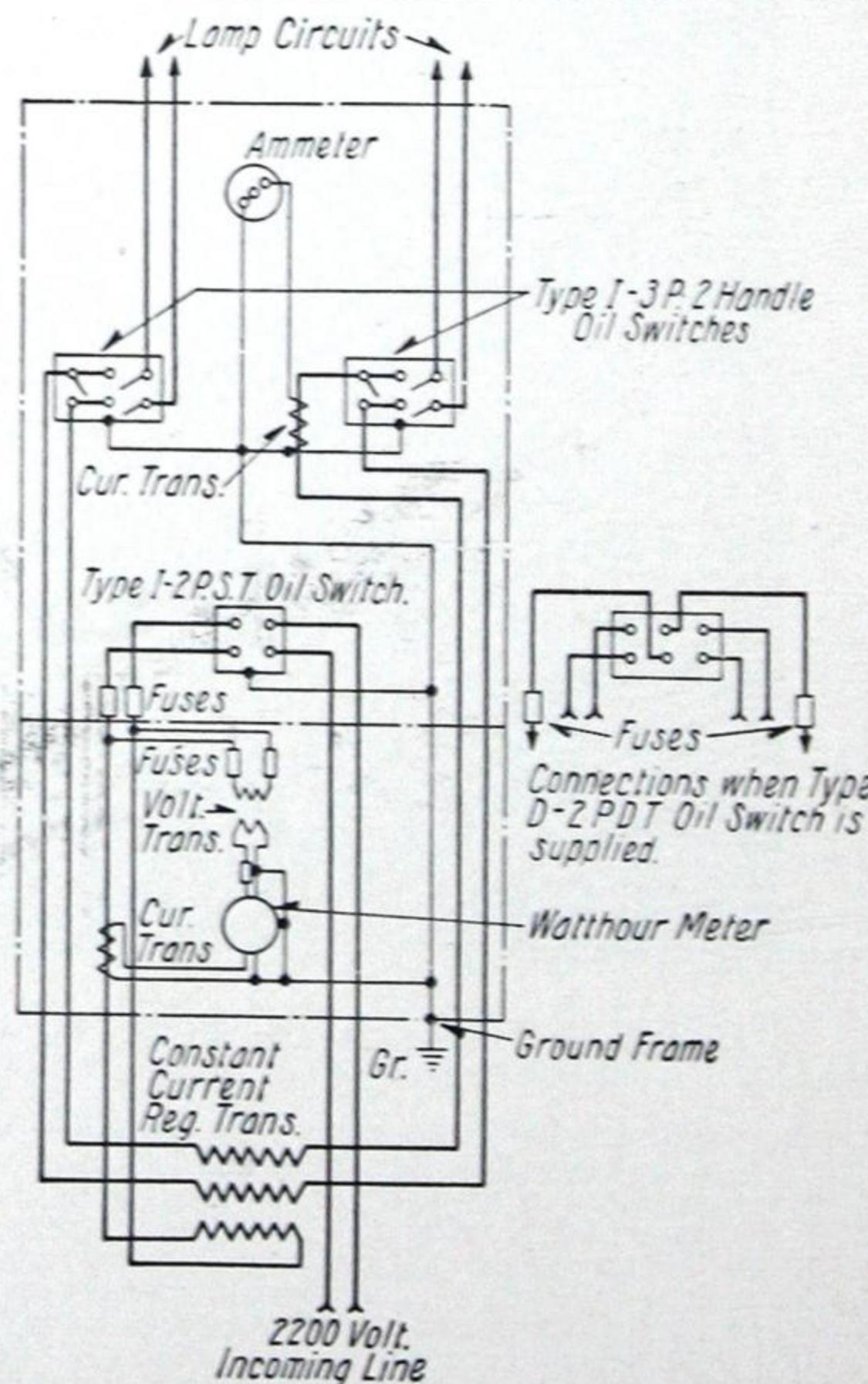


DIAGRAM OF CONNECTIONS FOR TWO INTER-CONNECTED SECONDARY-CIRCUIT REGULATOR, AND TWO-CIRCUIT PANEL

## MOVING COIL REGULATING TRANSFORMERS AND CONTROL PANELS—(DS783)—Continued

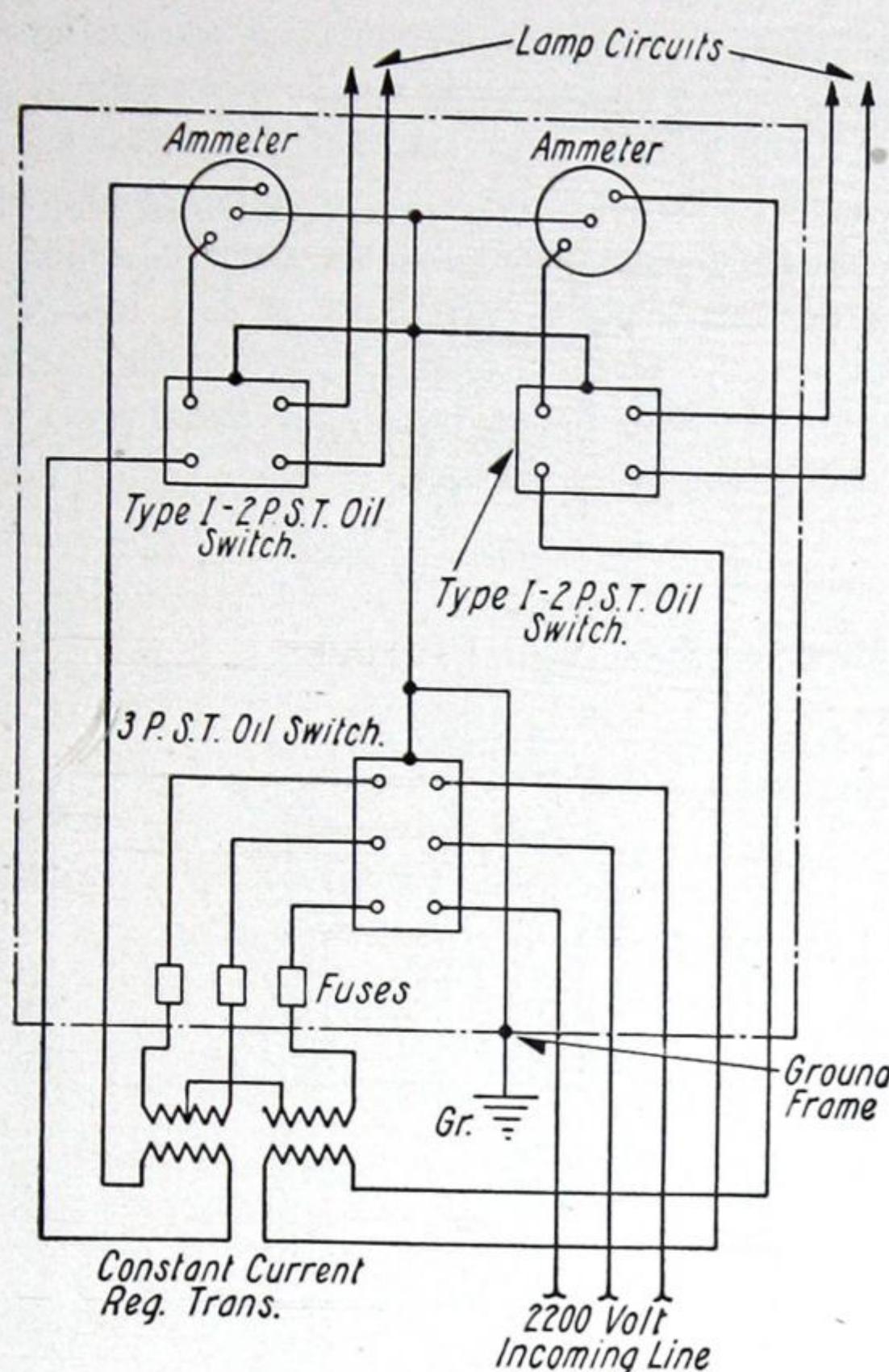


DIAGRAM OF CONNECTIONS FOR OPERATING TWO SINGLE-CIRCUIT REGULATORS AS BALANCED LOAD ON THREE-PHASE CIRCUIT

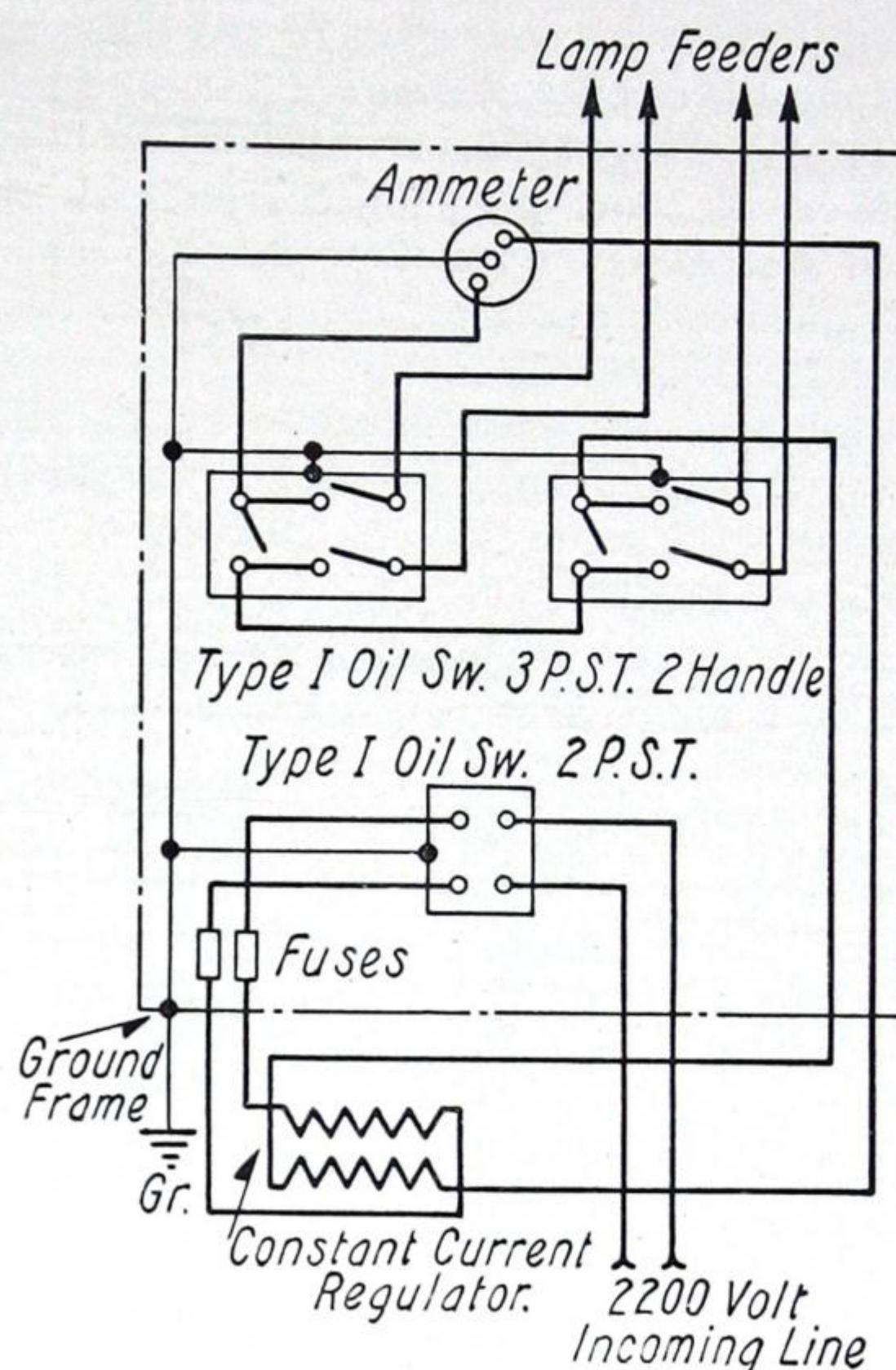


DIAGRAM OF CONNECTIONS FOR SINGLE-CIRCUIT REGULATOR AND TWO-CIRCUIT PANEL

cast iron frames held together by large tie rods. Covers of expanded metal are provided and fit in between the upper and lower frame castings. These covers, while they permit a free circulation of air, protect the coils from injury and also prevent the attendant from accidentally coming into contact with the live parts.

**Installation**—With a transformer of this type, in which the free movement of parts is essential in order to secure good regulation, it is necessary that the transformer be carefully leveled. It should be located in a place free from dirt and moisture and of sufficient area to insure free circulation of air. The small weights in the counterweight must be adjusted to give the proper current value.

**\*Automatic operation** with a time switch may be successfully obtained providing the load is such that the coil separation is not more than two inches. With light loads auxiliary blocks or catches may be installed by the operator for reducing the movement of the secondary coil toward the primary coil when the power is interrupted. A dashpot is also recommended for use on a regulator operating under these conditions or with arc lamps, and can be furnished at an additional list price of \$15.00

**Instructions**—Complete instructions for its operation under various conditions of load and voltage accompany each transformer.

#### CONTROL PANELS

A control panel, on which is mounted suitable accessory apparatus, is required when the regulator system is employed.

The control panels resemble in general construction and design the panels manufactured by this Company, which have given excellent satisfaction in series arc-lighting installations. They are of black marine-finished slate mounted on gas pipe framework arranged for bracing to the floor and carry all the necessary apparatus for metering and controlling the energy used in this system. Every effort has been made to reduce the amount of equipment involved to a minimum. Only such apparatus is specified as experience has indicated is necessary for good operating results.

The standard panel for single-circuit constant-current regulators has mounted on it (a) one four-pole single-throw type I oil switch, which with one operation connects both the primary and secondary coils to their respective circuits; (b) one alternating-current high-voltage type SR ammeter; (c) one double-pole fuse block (two single-pole fuse blocks on high capacity); and (d) four enclosed fuses (two extra ones) mounted on the back and connected in the primary circuit.

If special conditions require separate operation of the primary and secondary circuits, the standard design of arc regulator panel suitably arranged for the capacity of regulator desired, can be furnished.

**Double circuit** panels can be supplied for any regulator, permitting one regulator to control two lighting circuits. On these panels each lighting circuit is controlled by a three-pole two-handle type I oil switch, thus permitting either circuit to be short-circuited and cut off from the regulator with-

## MOVING COIL REGULATING TRANSFORMERS AND CONTROL PANELS—(DS783)—Continued

out disturbing the operation of the other circuit. The panel is of black marine finished slate and has the same accessory apparatus mounted on it as the single-circuit panel excepting the four-pole switch which is replaced by the three-pole two-handle oil switches already described, and a separate two-pole switch for the primary circuit.

A sub-panel for watthour meter can be supplied for any of the standard panels. This sub-panel is of

black marine finished slate and is for mounting on the same frame as and directly under the standard panel. This equipment is often necessary in order to keep a record of the exact input to the street-lighting system.

The apparatus mounted on this sub-panel consists of one type C watthour meter, one voltage transformer, one current transformer, and one double-pole fuse block with four fuses (two extra) for the voltage transformer.

## PRICES

## Regulating Transformers for 2400, 2200, or 2000-Volt Primary

LAMP CURRENT AMPERES		7.5	Capacity	Frequency	APPROX. Wt. LB.		
5.5	6.6	Style No.	Kva.	Cycles	Net	Shipping	List Price
Style No.	Style No.	237038	4	60	480	725	\$440 00
200598	200599	237039	8	60	685	985	550 00
200601	200602	237040	12	60	850	1200	650 00
200604	200605						
200607	200608	237041	17	60	1000	1350	780 00
200610†	200611	237042	24	60	1250	1650	970 00
200613†‡	200614†‡	237043†‡	34	60	1350	1750	1200 00
236672*‡	236673*‡	237044*‡	50		1800	2200	1600 00
.....	236674*‡	237045*‡	68	60	2200	2000	2000 00
207256	207257	237220	3	25	685	985	520 00
207259	207260	237221	4.75	25	850	1200	600 00
207262	207263	237222	7	25	1000	1350	700 00
207265	207266	237223	10	25	1250	1650	800 00
207268†	207269	237224	14	25	1350	1750	900 00
207271†	207272†	237225†	20	25	1800	2200	1200 00
207274†‡	207275†‡	237226†	28	25	2200	2600	1300 00

\*Furnished for two interconnected circuits only.

†Two interconnected circuits; may be operated as single circuit if desired.

‡Current transformer is required for ammeter in secondary circuit.

§For transformer equipped with dashpot, add \$15.00 to list price.

## REGULATOR CONTROL PANELS

Order panels by description and give style number of regulator to be controlled.

Double-throw panels otherwise similar to the single-throw panels shown can be furnished at an additional list price of \$20.00 to the respective single-throw panels.

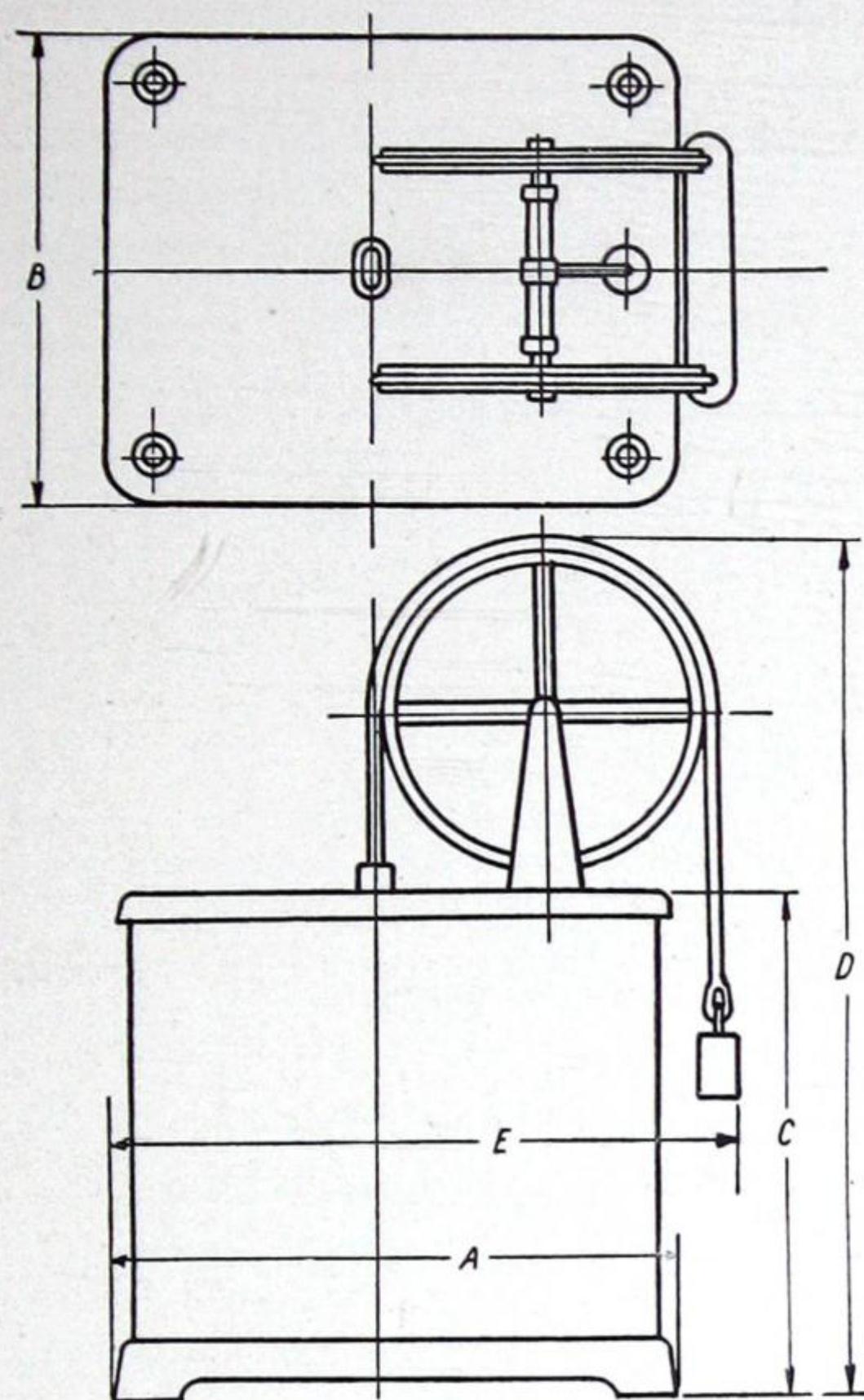
A current transformer (type KA) for the ammeter in the secondary circuit, complete with mounting brackets, can be furnished for any panel at an additional list price of \$40.00. A current transformer must be used with any regulator having a secondary load voltage exceeding 4000.

Description	Shipping Wt., Lb.	List Price
Single-circuit single-throw (one switch) control panel for any size regulator not exceeding total load voltage of 4000. (For Mazda lighting only).....	300	\$125 00
Single-circuit single-throw (two switches) control panel for any size regulator not exceeding total load voltage of 4000.....	350	150 00
Two-circuit single-throw (three switches) control panel for any size regulator not exceeding total load voltage of 4000.....	450	170 00
Sub-panel for any standard panel complete with necessary watthour meter, current and voltage transformers, fuse-blocks and fuses.....	150	150 00

## MOVING COIL REGULATING TRANSFORMERS AND CONTROL PANELS—(DS783)—Continued

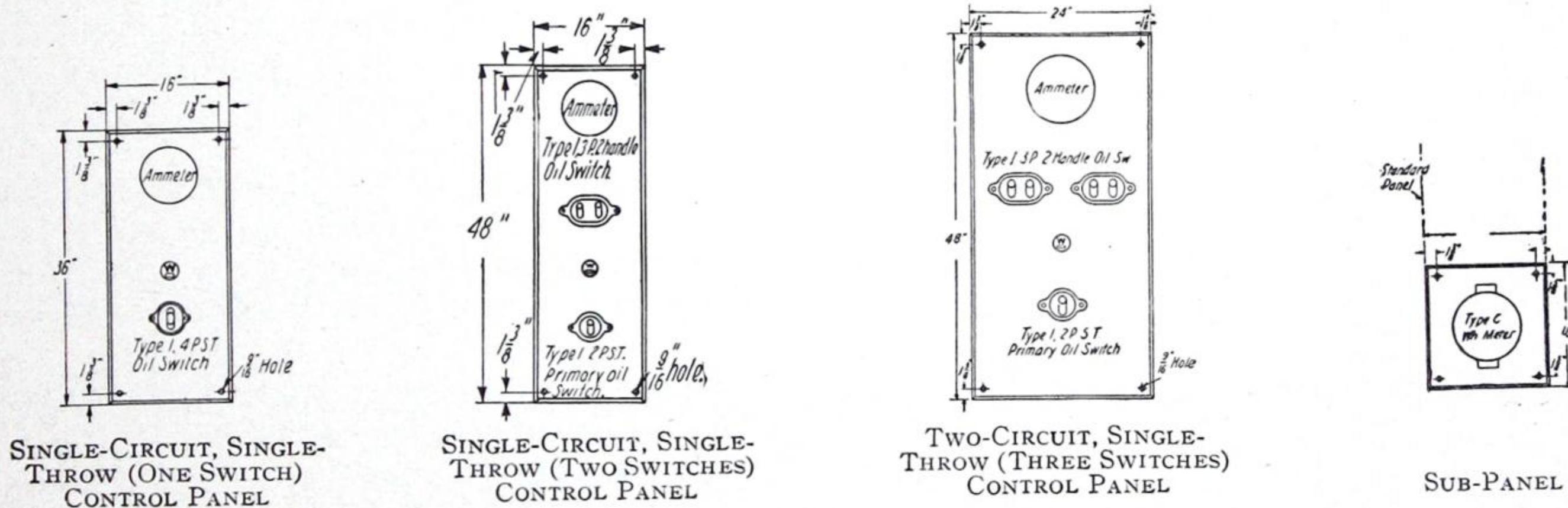
## OUTLINE DIMENSIONS

## Moving Coil Regulating Transformers



KVA.	DIMENSIONS, INCHES				
	25 Cycles	60 Cycles	A	B	C
...	4	21 $\frac{5}{8}$	17	30 $\frac{1}{2}$	50
3	8	23	18	33 $\frac{3}{8}$	55 $\frac{1}{8}$
4.75	12	25 $\frac{1}{8}$	20	33 $\frac{3}{4}$	55 $\frac{1}{8}$
7	17	26	21	35 $\frac{1}{8}$	57 $\frac{3}{8}$
10	24	28 $\frac{3}{4}$	26	25 $\frac{3}{8}$	58
14	34	32 $\frac{1}{2}$	29	34 $\frac{1}{8}$	55 $\frac{1}{2}$
20	50	34 $\frac{1}{4}$	30	36 $\frac{1}{4}$	60
28	...	36	32	36 $\frac{1}{8}$	63 $\frac{3}{4}$
...	68	36	32	41 $\frac{1}{8}$	65 $\frac{3}{4}$

## Control Panels



SINGLE-CIRCUIT, SINGLE-THROW (ONE SWITCH) CONTROL PANEL

SINGLE-CIRCUIT, SINGLE-THROW (TWO SWITCHES) CONTROL PANEL

TWO-CIRCUIT, SINGLE-THROW (THREE SWITCHES) CONTROL PANEL

SUB-PANEL

One-Switch Panel is  $1\frac{1}{4}$  inches thick and has  $\frac{1}{4}$  inch bevel; Two-Switch and Three-Switch Panels are  $1\frac{1}{2}$  inches and have  $\frac{3}{8}$  inch bevel.

Width of sub-panel is 16 or 24 inches and thickness  $1\frac{1}{4}$  or  $1\frac{1}{2}$  inches to match control panel.

These dimensions are for reference only. For official dimensions apply to the nearest district office.

## REACTANCE COIL REGULATORS FOR MAZDA STREET SERIES LAMPS—(DS781)

The reactance coil regulator herein described is particularly useful on circuits which are remote from stations where apparatus can be housed. The outfits are especially designed for service where pole mounting and operation with a time switch is desirable. This simplifies the circuit construction and thus reduces the expense of serving outlying towns which may have constant potential feeder service for residence lighting, but for street lighting have nothing available except multiple lamps or long special series circuits from larger existing installations. They are used with the inexpensive and well-known film cutout street hoods, no change being required in these devices.

The particular advantages of this system of control are: (1) Low cost of installation and apparatus. (2) Simplicity of wiring and operation. (3) Protection of circuit against grounds.

### Construction

The standard adjuster socket transformers with taps, having a range of from 55% to 100% of maximum voltage rating are regularly used with reactance coils to make up these reactance coil regulators. These transformers are thoroughly described under the adjuster socket system. By reason of their tap arrangement, it is possible to adjust the current to within less than 1% of any required value.

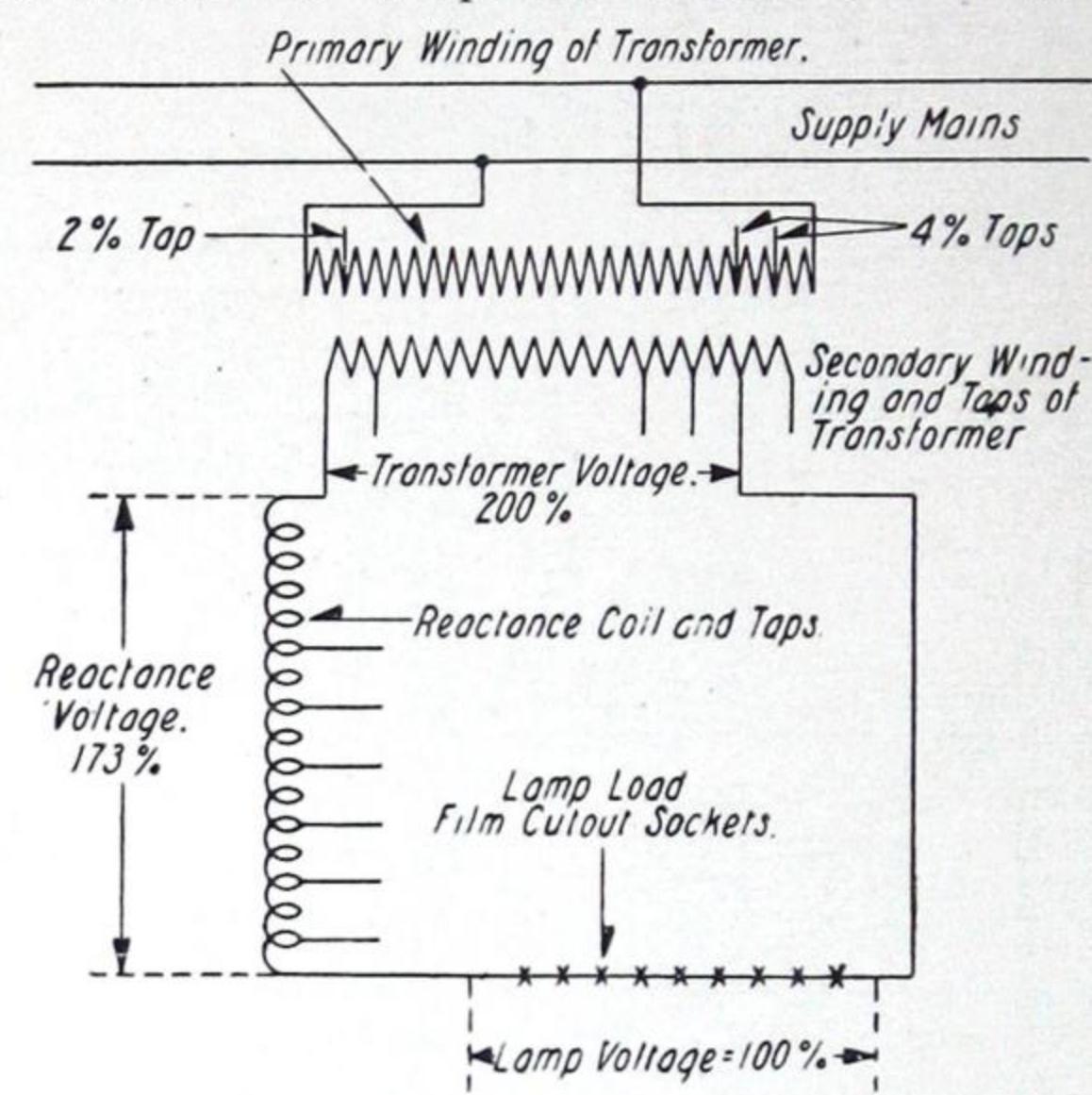
The reactance coils used in connection with this system are separately mounted, thus making it possible to adjust the taps conveniently, and obtain any desired power factor and consequent protection within the range of the apparatus.

### Operation

This system keeps the current in the series lamp circuit from rising abnormally by the use of a reactance in series with the lamp. If one lamp goes out, the impedance of the circuit is diminished by a much lower percentage because of this constant fixed reactance in series with the lamp. Consequently the larger the proportional value of reactance to lamp resistance, the closer will be the regulation with a large percentage of lamps out. Other conditions being equal, a 50% power factor regulator will, therefore, hold the current much closer to normal with a given percentage lamps out than an 80% power factor regulator. A regulator with 30% power factor would be even better in this respect. The relative cost of the complete regulator decreases as the power factor increases for a given load.

The efficiency of these regulators is relatively high, there being but comparatively small loss in the reactance coil, and transformer. At full load these efficiencies will be between 90 and 95% for the various sizes.

The regulation as explained above, depends altogether upon the power factor, it being understood that Mazda "C" lamps are inherently self-regulating



Reactance Coil Regulator System Showing Relative Voltages for 50% Power Factor

ing to a certain extent, because their resistance increases with the increase in current in the lamps, which causes the temperature rise.

### NORMAL POWER FACTOR

Outage	50%	80%	100%
10	2.1	4.5	6
20	4.2	10	13.7
30	6.2	16	23.5
Short Circuit	16	63	....

% current increase above normal.

In ordering reactance coil regulators, state the maximum kilowatts in lamp load for which the regulator is desired, the power factor rating desired, and give style number of the transformer and reactance to be used.

The reactance coils are rated at 6.6 amperes, 60 cycles and maximum voltages as follows:

Style No. 240793—600 volts.

Style No. 240794—1290 volts.

Style No. 246447—2600 volts.

The smallest unit is mounted in a cast-iron gum-filled case with all leads brought out of case. The larger units are mounted in oil-insulated-transformer parts with a terminal board for changing connections, and only two leads are brought out. Taps are provided for voltages down to about 25% of the maximum.

The kilovoltamperes of the reactance coil to give 50% or 80% power factor is respectively 173% and 75% of the lamp load carried by the complete reactance coil regulator. Taps are provided to enable the operator to maintain approximately 50% or 80% power factor respectively throughout the range of the adjustable transformer with which the reactance coil is used.

## REACTANCE COIL REGULATORS—(DS781)—Continued

## PRICES

Max. Kw. Mazda Lamps	Style Number	TRANSFORMERS Range of Volts	REACTANCE Style No.	Required Volts	Total Shipping Weight	List Price
<b>Rated on 80% Power Factor</b>						
2.10	219133	215-395	240793	236	275	\$220 00
3.30	219134	338-625	240793	375	360	240 00
4.20	219135	435-800	240793	480	400	260 00
6.00	242015	620-1140	240794	685	760	310 00
7.50	219136	823-1500	240794	900	860	370 00
12.00	219137	1250-2300	246447	1385	1220	410 00
16.00	246446	1650-3000	246447	1800	1560	500 00
<b>Rated on 50% Power Factor</b>						
1.30	219133	215-395	240793	340	275	220 00
2.00	219134	338-625	240793	540	360	240 00
2.60	219135	435-800	240794	690	400	270 00
3.75	242015	620-1140	240794	980	760	310 00
5.00	219136	823-1500	240794	1290	860	370 00
7.50	219137	1250-2300	246447	2000	1220	410 00
10.00	246446	1650-3000	246447	2600	1560	500 00

Prices for other capacities and frequencies furnished on request.

## OUTLINE DIMENSIONS

These dimensions are for reference only.  
For official dimensions apply to the nearest  
district office.

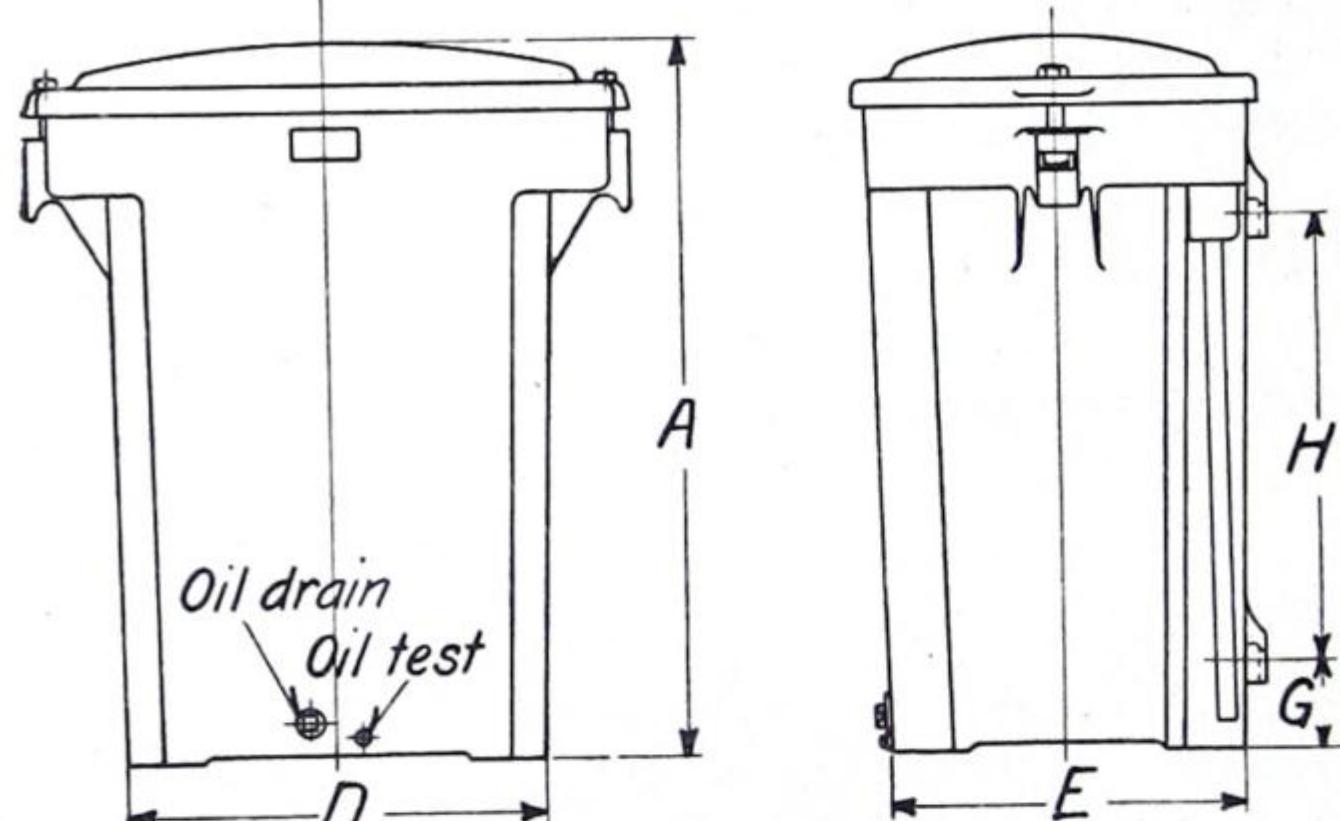
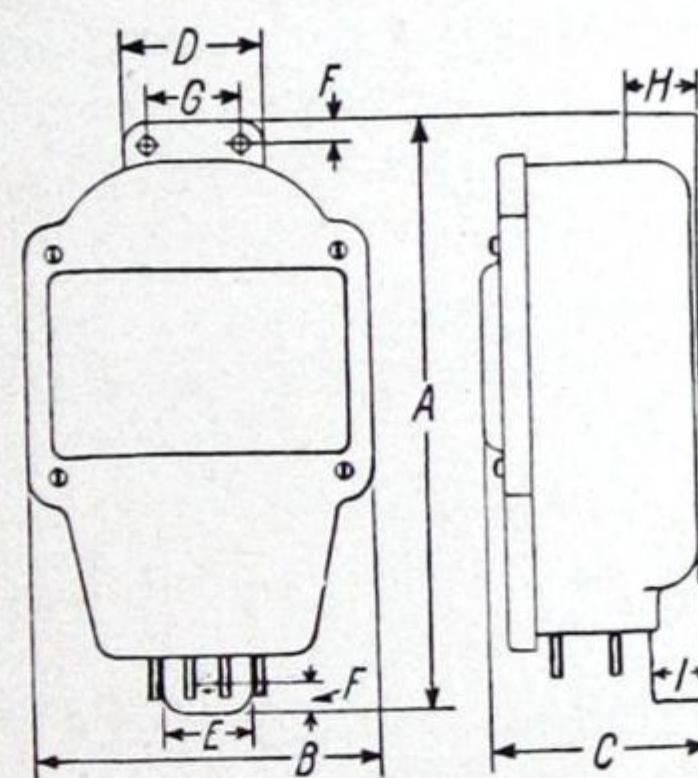
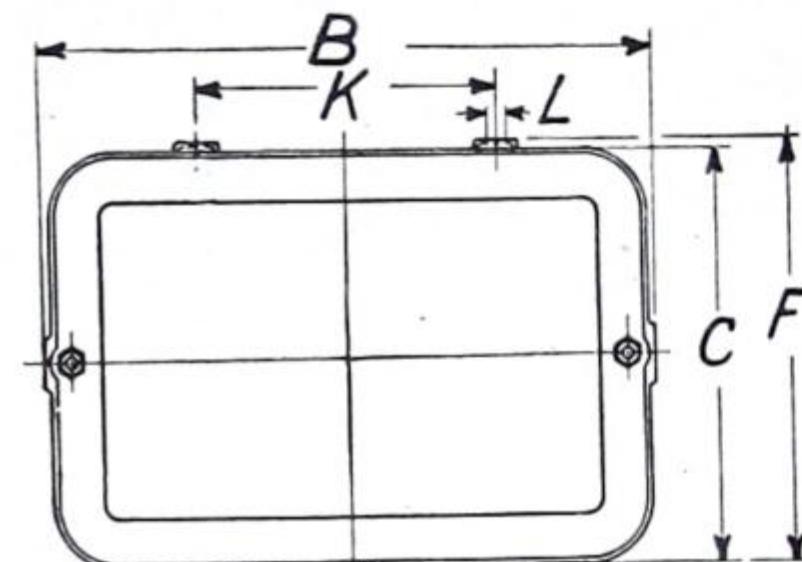


FIG. 1

FIG. 1

F.G. 2

Style No.	DIMENSIONS IN INCHES									Approx. Net Weight Lb.
	A	B	C	D	E	F	G	H	I	
240793	15 $\frac{3}{4}$	10 $\frac{5}{8}$	6 $\frac{1}{8}$	4 $\frac{1}{4}$	1 $\frac{3}{4}$	$\frac{3}{4}$	2 $\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	86

FIG. 2

Style	DIMENSIONS IN INCHES									
	A	B	C	D	E	F	G	H	K	L
240794	23 $\frac{1}{8}$	19 $\frac{3}{4}$	12 $\frac{5}{8}$	14 $\frac{1}{4}$	10 $\frac{7}{8}$	13	6 $\frac{1}{8}$	10	9	$\frac{9}{16}$
246447	25 $\frac{1}{2}$	22 $\frac{3}{8}$	14 $\frac{7}{8}$	15 $\frac{3}{4}$	12 $\frac{7}{8}$	15 $\frac{1}{4}$	3 $\frac{3}{8}$	16	11	$\frac{9}{16}$
246446*	32	30 $\frac{1}{4}$	....	24 $\frac{1}{8}$	15 $\frac{3}{4}$	21 $\frac{5}{8}$	3 $\frac{7}{8}$	21	12	$\frac{13}{16}$

\*Dimensions for other Transformers will be found on pages covering Series Mazda Systems.

## LUXSOLITE FIXTURES AND TRANSFORMERS

### FOR HIGH CANDLE-POWER MAZDA LAMPS—(DS704)

#### Application

These Luxsolite fixtures are especially designed for use with Westinghouse type C Mazda lamps of high candle-power for lighting residential streets, parks, and other large outdoor spaces.

#### Construction

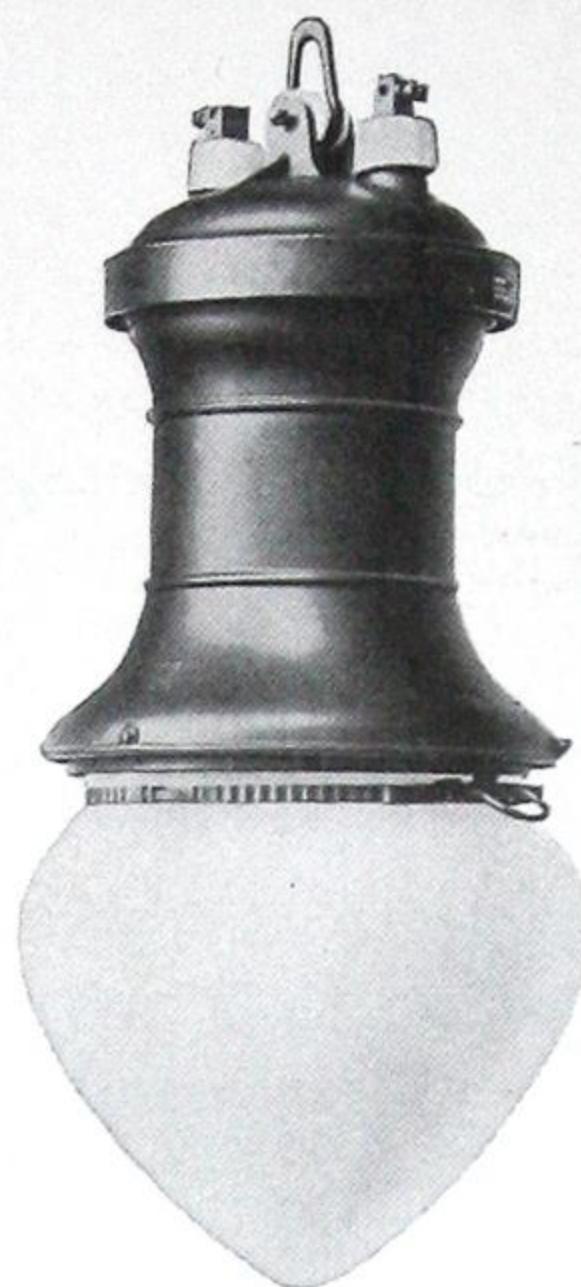
The **cases** are constructed of solid copper finished in black enamel. The top is of cast iron supported by a porcelain insulator with hanger link.

The case is interchangeable for either a film-cutout socket, a multiple socket or an auto-transformer with a multiple socket (film-cutout socket is not required with auto-transformer). Where the auto-transformer exceeds the dimensions of the 6.6-to-20-ampere 60-cycle 300-watt or 25-cycle 200-watt rating, a slightly larger case is used.

**Binding posts** are provided as in the best arc lamp practice, making the neatest, most convenient, and most desirable construction.

A **reflector** may be used if desired being fastened to the fixture by a very simple attachment.

A **globe** similar to that used with arc lamps is used with these fixtures. The opal globe is most attractive as it becomes filled with light when the lamp is burning, and acts as a highly efficient secondary



FIXTURE COMPLETE WITHOUT  
REFLECTOR

source of light without the dazzling effect of a lamp with visible filament.

A refractor, instead of a globe, may be used with but very slight modification of the fixture.

The **globe bail** supporting the globe consists of a corrugated band of copper hinged at one side and latched at the other in a way that permits of readily removing the lamps with but one hand.

The refractor support is hinged and latched in the same manner as the globe bail. With but slight modification the fixtures are interchangeable.

**Ventilation** for the lamp, so necessary to its long life, is amply secured by an inlet around the top of the globe and an outlet under the edge of the top casting. Both openings are carefully protected from the entrance of rain, which would crack the lamp. The openings are carefully screened to prevent insects from entering.

**Auto-transformer**—To secure the full advantage of the highest efficiency in this type of lamp a larger current is necessary than is usually available in commercial series circuits. To obtain this current, a special auto-transformer of the core type has been designed for use in series fixtures. The standard winding is for 6.6-ampere circuits with a tap provided for 7.5-ampere circuits, the latter giving approxi-



FIXTURE COMPLETE WITH REFLECTOR



FIXTURE COMPLETE WITH REFLECTOR SHOWING GLOBE  
LOWERED FOR REMOVING LAMP

## LUXSOLITE FIXTURES AND TRANSFORMERS FOR HIGH CANDLE-POWER MAZDA LAMPS—(DS704)—Continued

mately the same performance. Windings for other current ratings may be obtained on order.

Taps are provided on the standard 1000 candle-power auto-transformers to take care of 600 candle-power, 20-ampere lamps, and on the standard 600 candle-power auto-transformer to carry 400 candle-power, 15-ampere lamps.

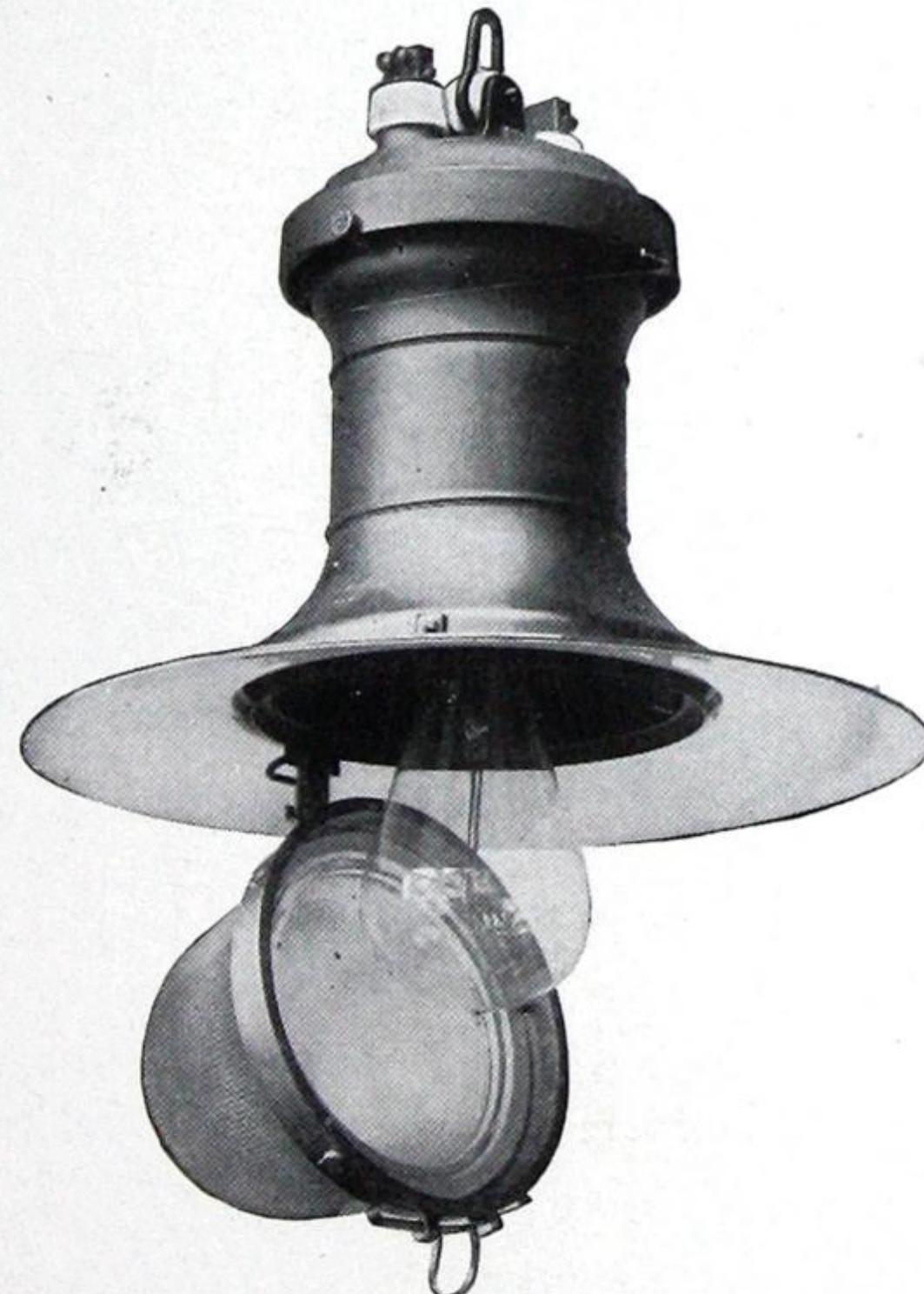
The insulation of the auto-transformer consists of micarta, and the whole auto-transformer is thoroughly impregnated in bakelite after completion. The operating temperature of the lamp is high and as the auto-transformer is quite close to it, the necessity for its careful insulation as to heat-resisting value cannot be overlooked.

**Socket**—A skeleton socket, specially designed to give the best ventilation possible to the large Mogul base of the type C Mazda lamp, is used with the auto-transformer type of fixture. This socket is readily removable from the fixture.

#### Performance

##### Of Fixture With Auto-Transformer

The temperature rise under normal conditions is less than 100 degrees Centigrade, thus allowing a

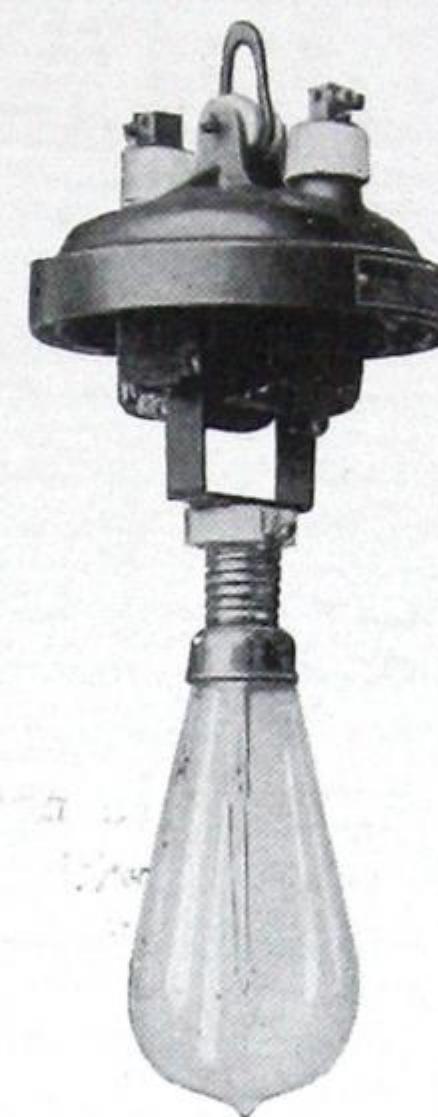


Fixture Complete With Reflector, Showing Refractor Lowered For Removing Lamp

large margin of safety when using the bakelite insulation. On open-circuited secondary with the lamp not burning, this temperature rise is slightly less than 100 degrees Centigrade.

**Current surges** in the lamp are greatly lessened by the design of the auto-transformer, there being approximately but 40 per cent increase in the lamp current with 100 per cent increase above normal value in the line current.

The **power factor** of the auto-transformer and lamp complete is 99 per cent, being so near unity that its effect on the operation of constant-current



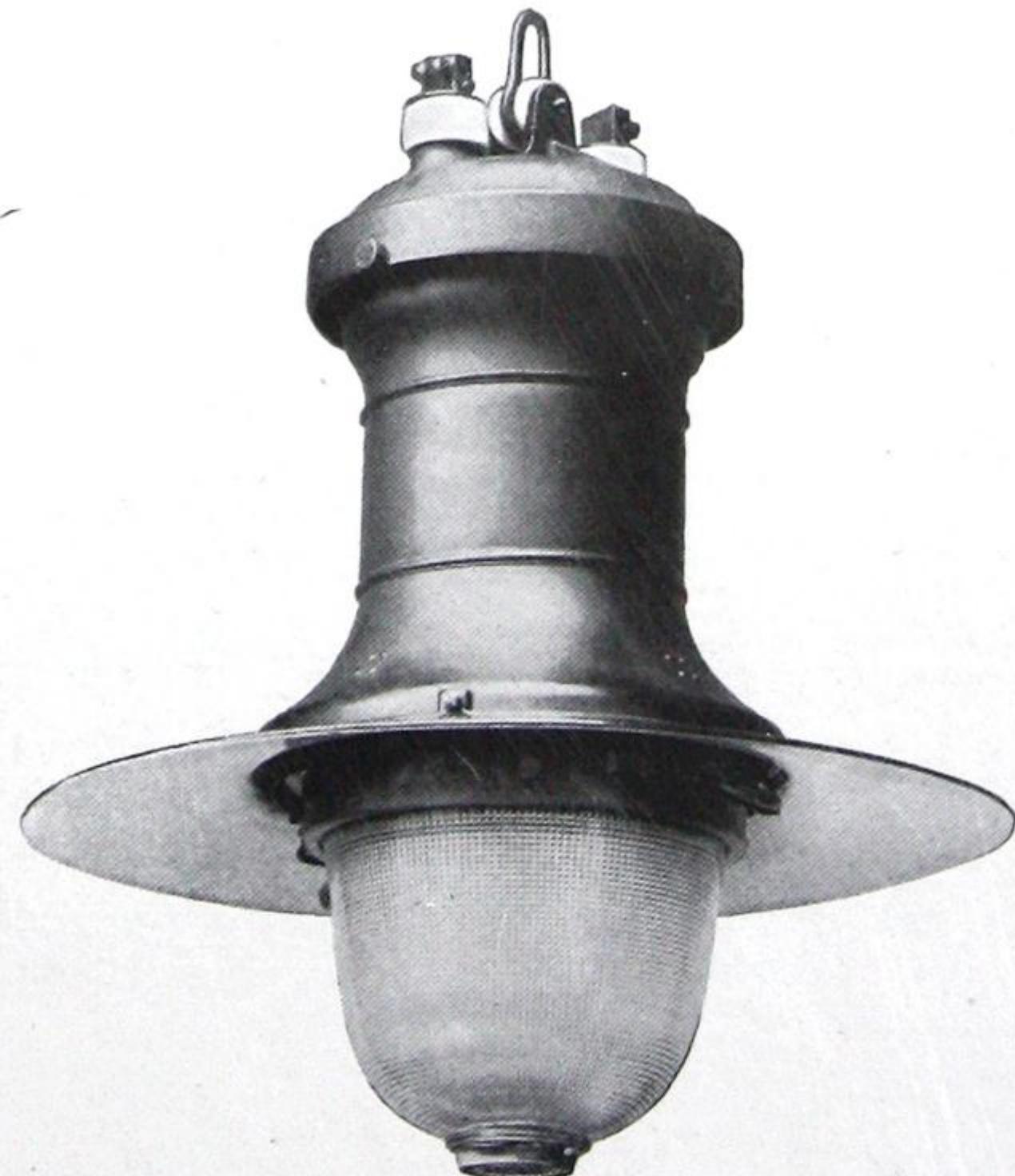
LUXSOLITE FIXTURE WITH GLOBE AND CASE REMOVED

regulators may be considered as practically non-inductive.

The efficiency of the auto-transformer varies with the current ratio, watts capacity, and the frequency. Efficiencies are based on the  $I^2R$  copper loss at 25 degrees Centigrade and the iron loss as measured by wattmeter. For 60 cycles the performance is as follows:

Watts	Current Ratio Amperes	Efficiency Per Cent
216	6.6 and 7.5 to 15	94.5
300	6.6 and 7.5 to 20	95.2
500	6.6 and 7.5 to 20	95.8

**Open-Circuit Voltage**—With lamp out the voltage rise on the primary or the secondary of the auto-transformer is approximately 200 per cent above normal. The auto-transformer is designed to protect itself from overheating under such conditions, and as it has a winding continuously in circuit, eliminates the necessity for a film cutout or other special protective device.



Fixture Complete With Reflector and Refractor

## LUXSOLITE FIXTURES AND TRANSFORMERS FOR HIGH CANDLE-POWER MAZDA LAMPS—(DS704)—Continued

## EXTERNAL LUXSOLITE TRANSFORMERS

The Westinghouse External Luxsolite Transformer (two winding) combines the advantages of the series systems of distribution with the safety of the multiple circuits. Outages caused by opening of the main series circuit due to breaking of loops to lamps are eliminated because the primary winding is continuously in the series circuit. By the use of these transformers in the bases of ornamental poles, low-tension wiring may be used in the poles, thus being much safer and less expensive to install. As the windings are not interconnected, the lamps can be renewed without danger to the operator while the circuit is alive.

## Construction

The transformers are of the core type construction. The case is of heavy sheet steel filled with gum. For **manhole** service, tinned heavy pipe outlets are provided on which a joint with the lead-covered cable may be wiped. Small feet are provided for supporting the transformer in the bottom of the pole base. For **overhead** service, the leads are brought out through the bottom in porcelain

bushings and a strap is provided on the side for mounting on a pole. Taps are also provided on the standard transformers to care for lamps of increased efficiency.

An insulation test of 20,000 volts is applied between primary and secondary windings of each transformer before shipment.

## Performance

The temperature rise under full load or with the secondary open circuit, in free air will not exceed 80 degrees Centigrade. The open circuit voltage with normal rated current of approximate sine wave form in the primary will not exceed 350 per cent of the normal rated secondary voltage. The full-load performance at 60 cycles is given in the table below. The efficiency is based on the copper loss at 75 degrees Centigrade and the iron loss as measured by wattmeter.

75 watt.....	88.2% at full load
216 watt.....	90.5% at full load
300 watt.....	91.6% at full load
500 watt.....	92.6% at full load
Primary Power Factor.....	99%



FIG. 1



FIG. 2



FIG. 3

Style number and list price includes transformer complete for manhole installation or pole mounting as designated. Standard windings are designed for operation on 6.6 ampere 60-cycle circuits not exceeding 6600 volts.

## PRICES

Style No.	Ratio	Watts	Fig. No.	APPROX. WTS. Net	APPROX. WTS. Shipping	List Price
<b>Manhole Type</b>						
242381	6.6 to 6.6	30 to 75	1	18	33	\$18 00
245648	6.6 to 6.6	30 to 75	2	18	38	18 00
242383	6.6 to 6.6	75 to 450	1	28	48	25 00
245649	6.6 to 6.6	75 to 450	2	28	48	25 00
242375	6.6 to 15	216 Max.	1	20	40	20 00
245645	6.6 to 15	216 Max.	2	20	40	20 00
242377	6.6 to 20	300 Max.	1	28	48	22 50
245646	6.6 to 20	300 Max.	2	28	48	22 50
242379	6.6 to 20	500 Max.	1	30	50	25 00
245647	6.6 to 20	500 Max.	2	30	50	25 00
<b>Pole Type</b>						
242382	6.6 to 6.6	30 to 75	3	18	38	18 00
242384	6.6 to 6.6	75 to 450	3	28	48	18 00
242376	6.6 to 15	216	3	20	40	20 00
242378	6.6 to 20	300	3	28	48	22 50
242380	6.6 to 20	500	3	30	50	25 00

## LUXSOLITE FIXTURES AND TRANSFORMERS FOR HIGH CANDLE-POWER MAZDA LAMPS—(DS704)—Continued

## PRICES

## Fixtures

**Style number** includes fixture complete with 6.6—7.5 ampere (primary) auto-transformer, series film-cutout socket, or large Edison-base multiple socket, as described; but does not include reflector or glassware, which must be ordered separately.

**List price** includes fixture complete with auto-transformer, film-cutout socket, or multiple socket, as described; glassware, and reflector.

Description	Lamp Watts	Frequency Cycles	Rated Horizontal Candle Power	Glassware	APPROX. WT., LB.			List Price
					Net With Globe	Shipping With Reflector and Glassware	Style No.	
With series film-cutout socket	.....	All	250-600	Globe	18	53	220841	\$18 50
With multiple socket	400-500	All	.....	Globe	18	53	220845	18 00
With multiple socket	750-1000	All	.....	Globe	18	53	220846	18 00
With auto-transformer*	.....	60†	400	Globe	25	58	220842	24 50
With auto-transformer*	.....	60†	600	Globe	25½	58	220843	26 50
With auto-transformer*	.....	60†	1000	Globe	26	58	220844	28 00
With series film-cutout socket	.....	All	250-600	Refractor	20	53	225351	25 25
With multiple socket	400-500	All	.....	Refractor	20	53	225355	24 75
With auto-transformer*	.....	60†	400	Refractor	27	58	225352	31 25
With auto-transformer*	.....	60†	600	Refractor	27½	58	225353	32 75
With auto-transformer*	.....	60†	1000	Refractor	28	58	225354	34 75

\*Style number and price include auto-transformer for 6.6-7.5-ampere (primary) circuits. For fixtures with auto-transformers for use on 4-ampere (primary) circuits order "Similar to Style No. .... except for 4-ampere (primary) circuits" and add 10 per cent to list price.

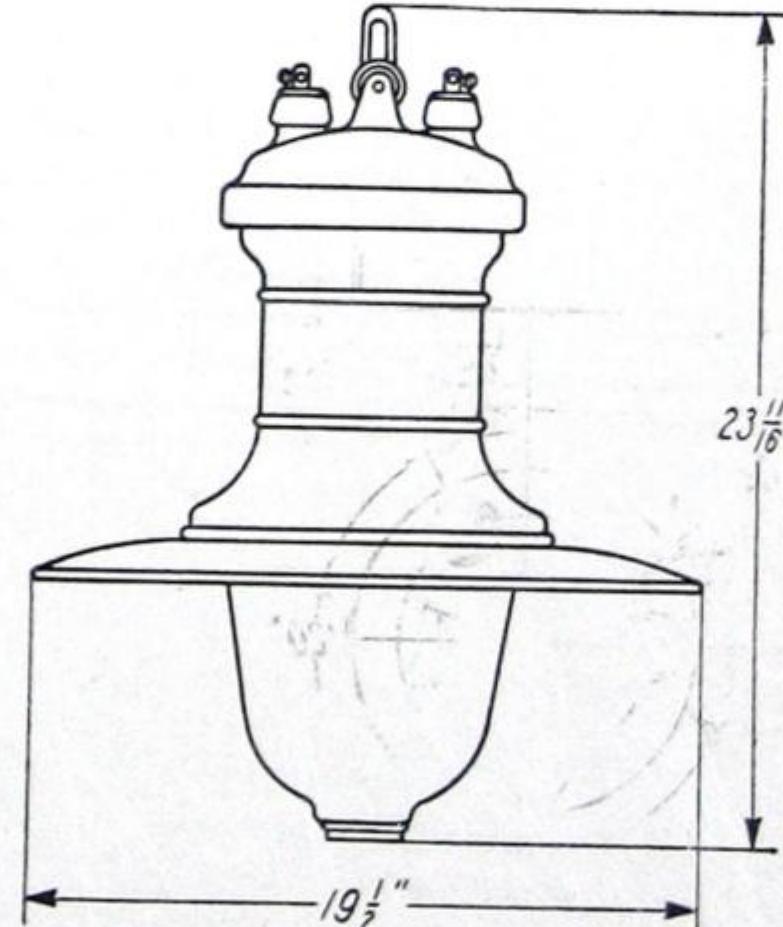
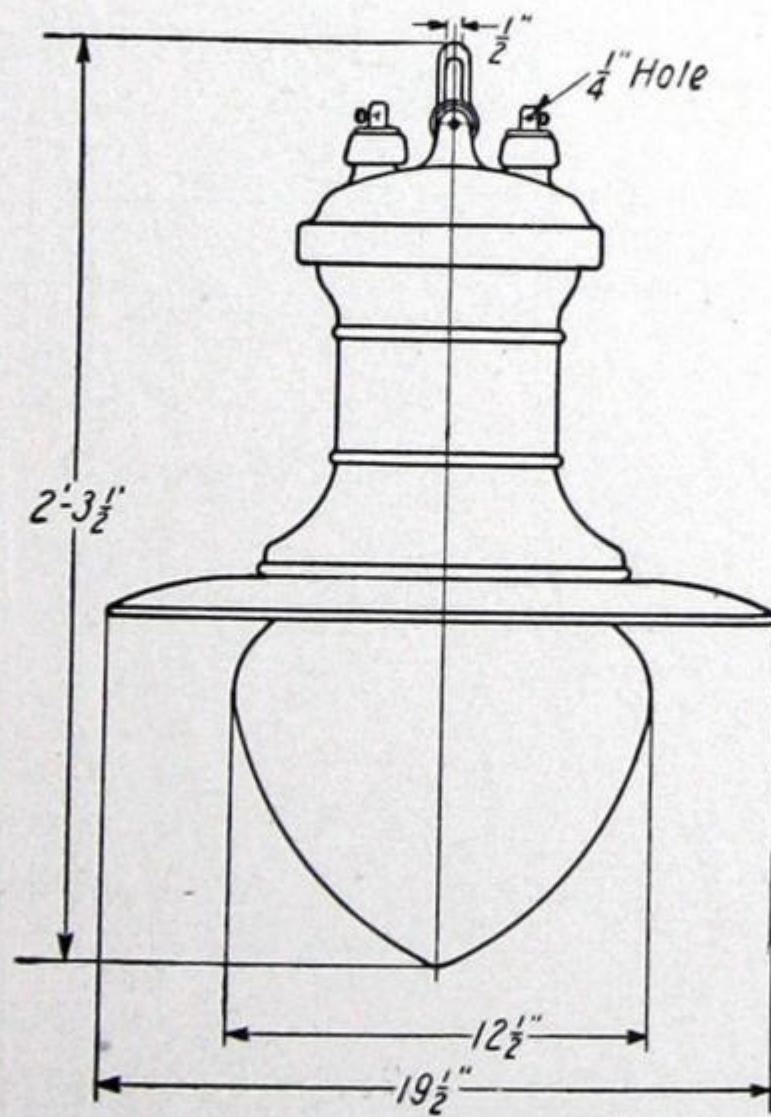
†For fixtures for use on 25 or 50-cycles order "Similar to Style No. .... except for use on 25 (50) cycle circuits" and add to the list price 25 per cent for 25-cycle and 15 per cent for 50-cycle.

## Accessories

Style number and price includes accessory complete as described.

Description	Watts	AMPERES	Frequency Cycles	Shipping Weight	Style No.	List Price
Auto-transformer	216	6.6-7.5	15	60	7½	220278
Auto-transformer	300	6.6-7.5	20	60	10	220267
Auto-transformer	500	6.6-7.5	20	60	14	220268
Twenty-inch reflector—porcelain enameled	.....	..	..	8	220890	2 50
Twenty-inch reflector—aluminum finished	.....	..	..	8	225076	2 50

## OUTLINE DIMENSIONS

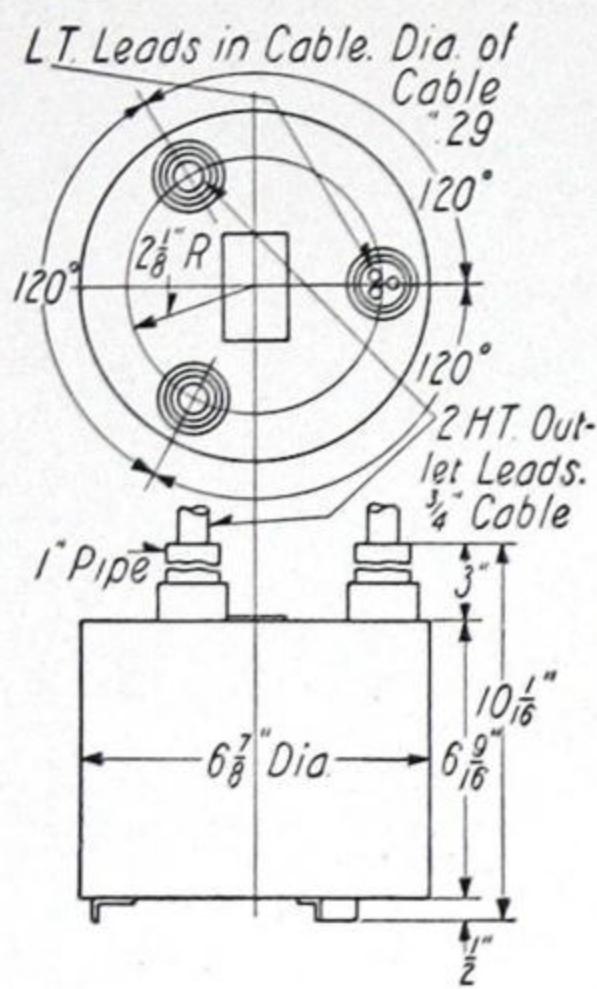


These dimensions are for reference only. For official dimensions apply to the nearest district office.

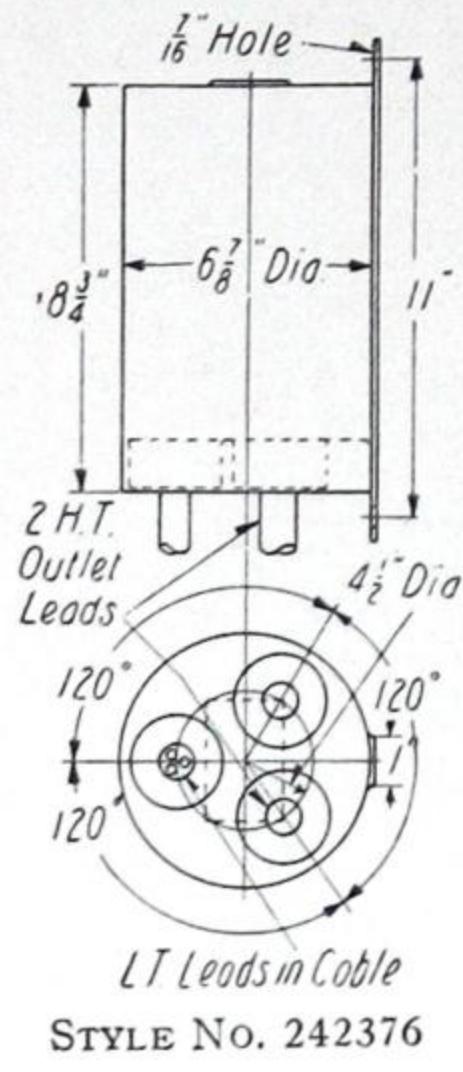
## LUXSOLITE FIXTURES AND TRANSFORMERS FOR HIGHCANDLE-POWER MAZDA LAMPS—(DS704)—Continued

## EXTERNAL LUXSOLITE TRANSFORMERS

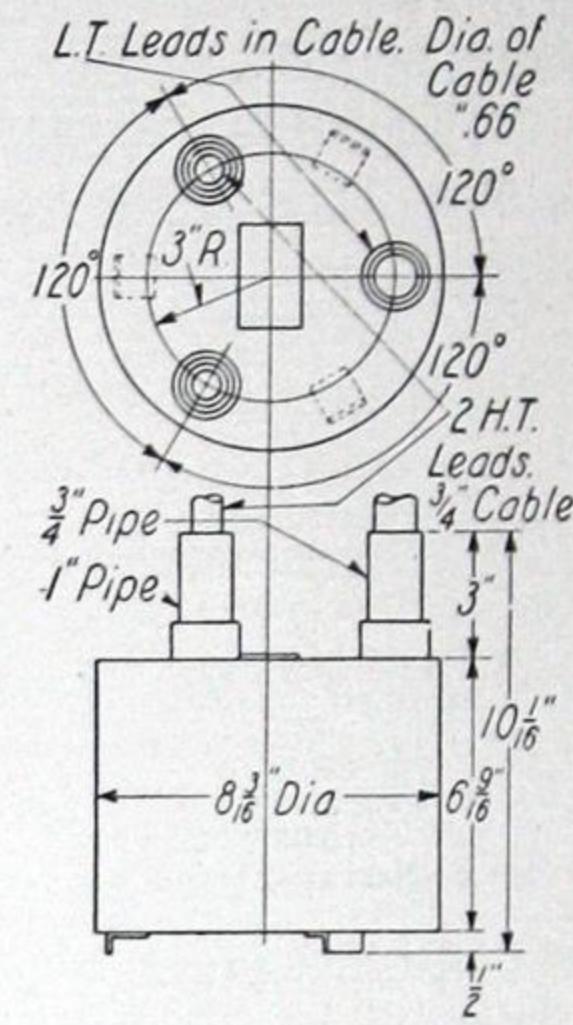
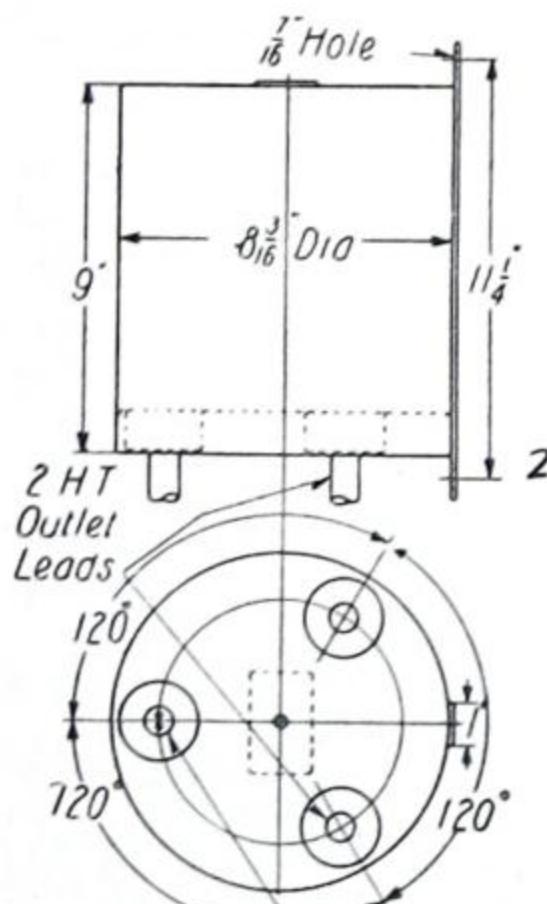
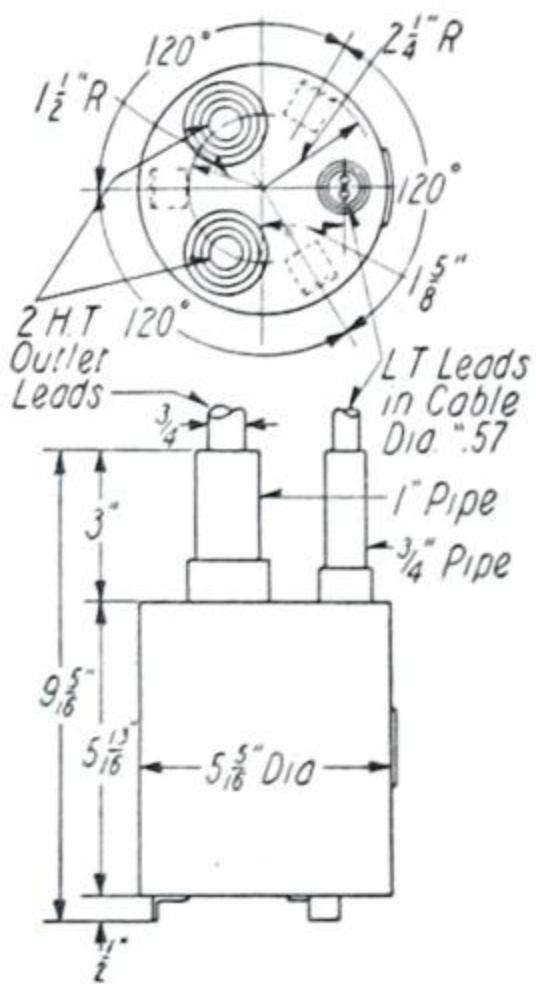
## OUTLINE DIMENSIONS



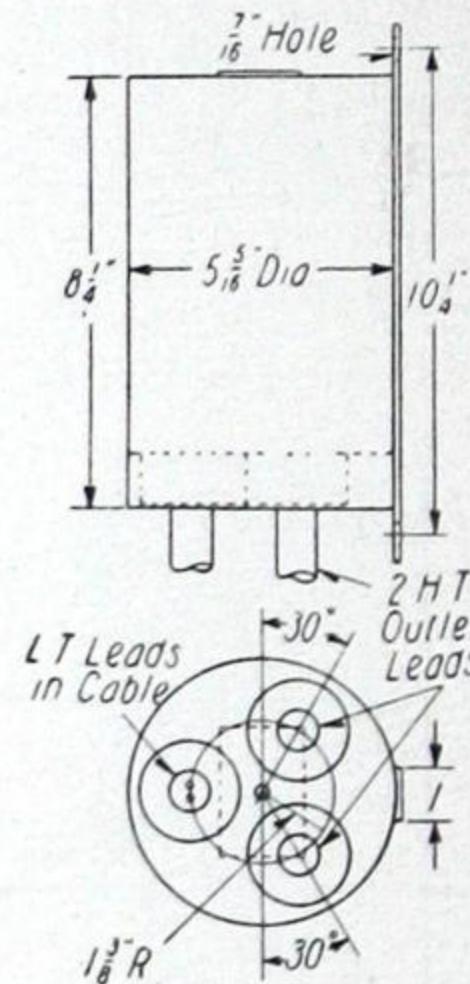
STYLE No. 242375



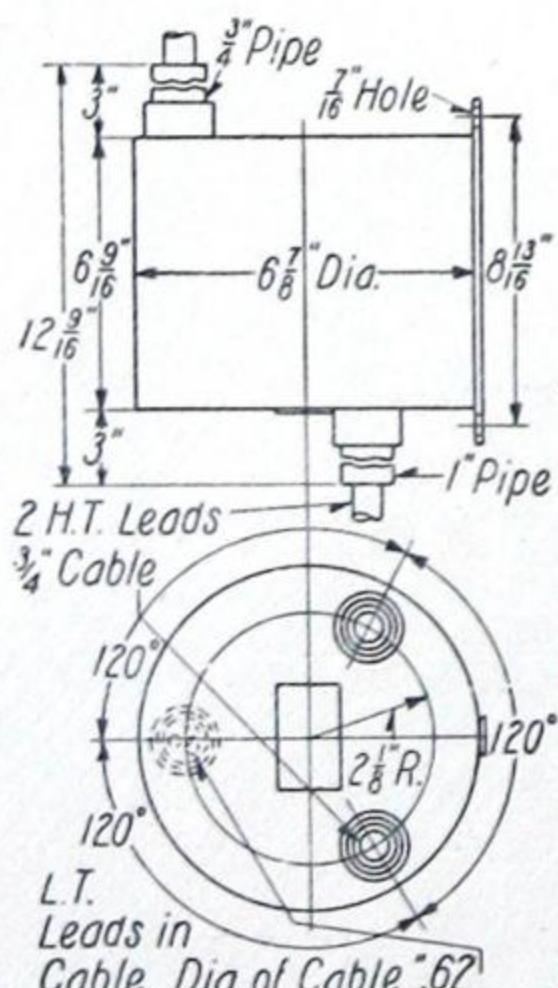
STYLE No. 242376

STYLE Nos. 242377, 242379  
AND 242383STYLE Nos. 242378, 242380  
AND 242384

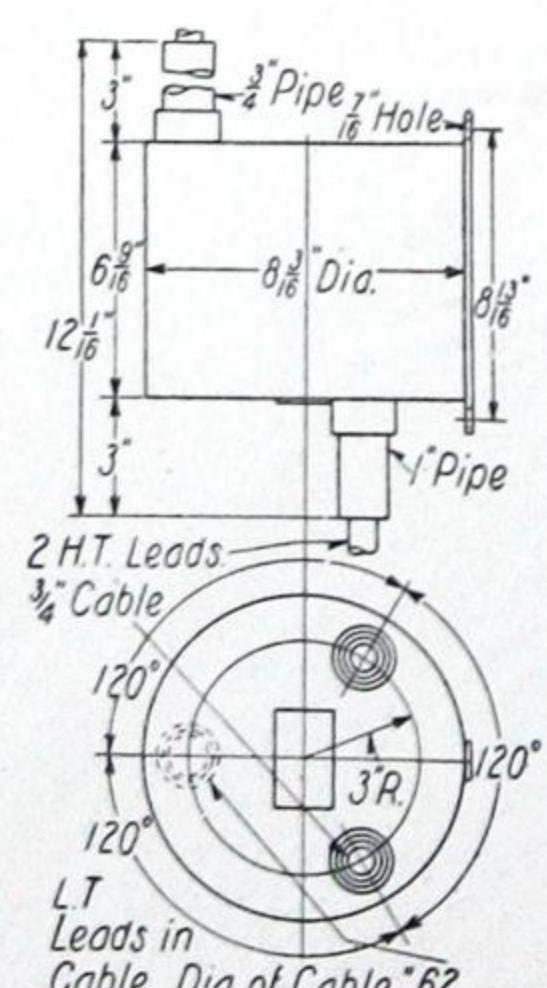
STYLE No. 242381



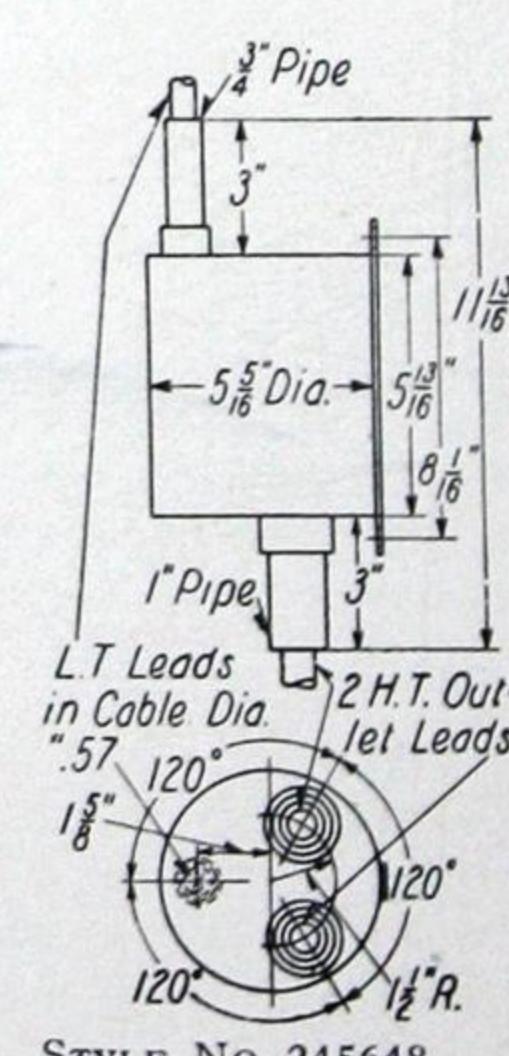
STYLE No. 242382



STYLE No. 245645



STYLE Nos. 245646, 245647 AND 245649



STYLE No. 245648

These dimensions are for reference only. For official dimensions apply to the nearest district office.

## WESTINGHOUSE SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)

By reason of their high efficiency series Mazda lamps of the type C design are very suitable for practically every form of street lighting.

Outlying districts of cities as well as small towns and suburban territory are best served by small lamps in street hoods. These serve particularly as markers at the most important points, thus reducing danger and expediting travelers. They are best controlled by some one of the three control systems described herein, i. e. adjuster socket, reactance regulator, or moving coil regulator.

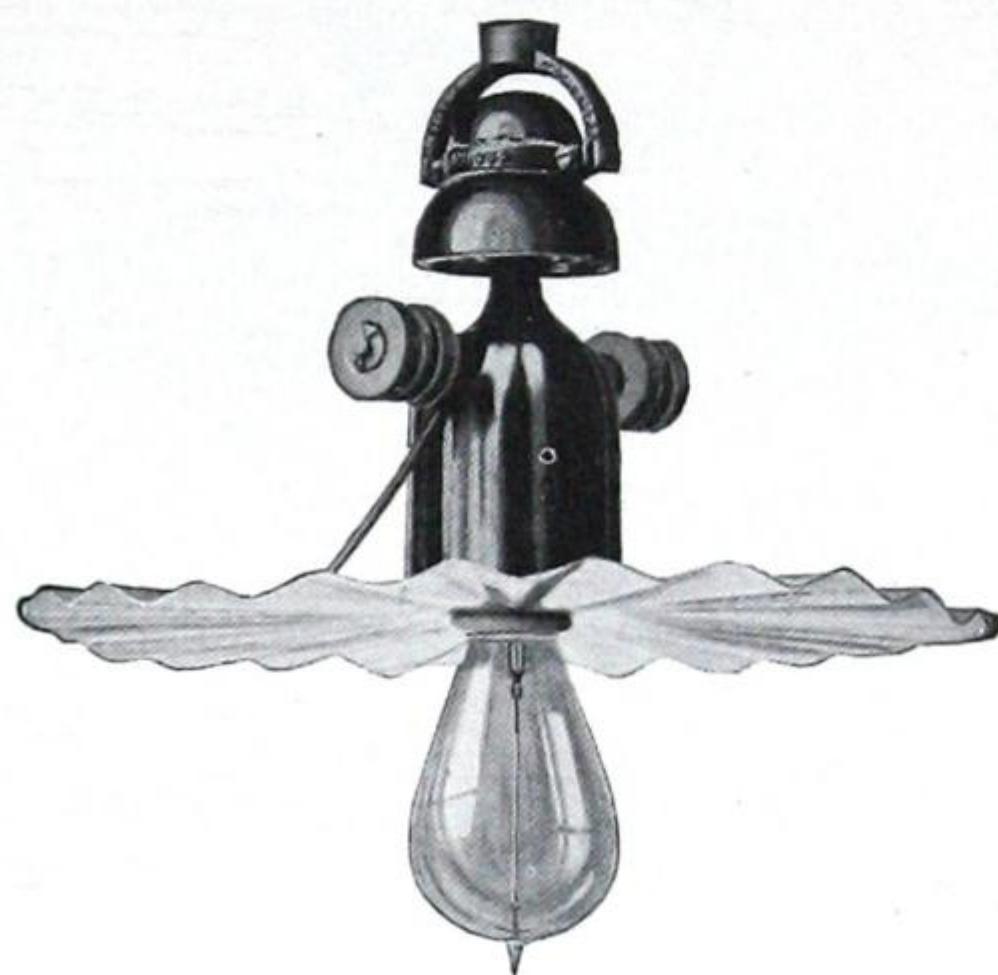
Residence streets in many instances are best served by street hood installations, using lamps of from 60 to 250 candle-power. The larger and more important streets requiring considerable attention may best be served by the Luxolite fixture, with high candle-power lamps. This unit is designed particularly for this class of service. Such circuits are best controlled by the constant current moving coil regulator inasmuch as they are usually reasonably accessible to a sub-station, having other machinery.

White-way lighting with the high efficiency Mazda C lamps has become very popular, particularly in small towns which are thus enabled to take advantage of high efficiency units with very simple apparatus and little attention. In connection with the ornamental posts, a line of insulating transformers for pole base mounting has been developed as described in pages covering Luxolite fixtures greatly

comparatively short length of circuit, convenient in most cases to a sub-station for installing the regulator.

### ADJUSTER-SOCKET SYSTEM

The adjuster-socket system consists of a simple series of lamps connected across constant-potential alternating-current mains, or across the secondary terminals of a constant-potential transformer. A



WESTINGHOUSE MAZDA STREET HOOD FOR BRACKET SUSPENSION. WITH SINGLE-PIECE REFLECTOR

reactance coil is connected in shunt across the terminals of each lamp and operates in a well-known manner to maintain the continuity and normal voltage of the circuit in case of burn-outs or lamp removals.

The **advantages** of the adjuster socket system of constant-current control are:

First. Low first cost of small installations, i. e., 5 kilowatts and less.

Second. Simplicity of installation on poles in remote districts for operation with a time switch.

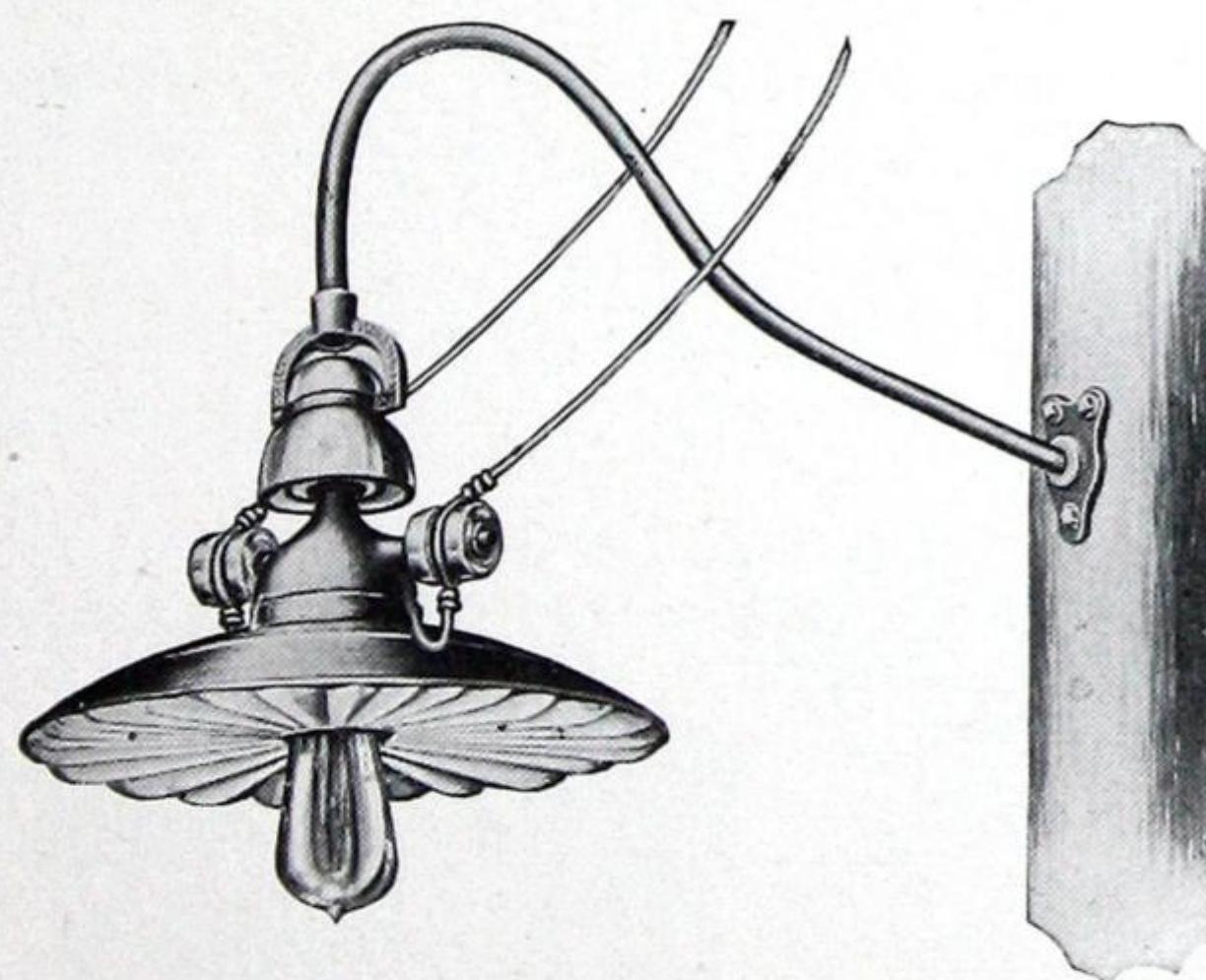
Third. Certainty of operation on very small circuits with low voltage inasmuch as there is no film to break down when the lamp goes out. The coil is always connected.

Fourth. Power factor of practically unity with high efficiency.

Fifth. Ease and certainty of circuit tests during daytime because coils maintain circuit continuity regardless of lamp breakage.

**Reactance Coil**—The reactance coil is one of the simplest and most economical devices ever developed for maintaining the continuity of a lamp circuit. It has an effective reactance voltage equivalent to the voltage of a burning lamp, but the loss of energy sustained by its use is only about 4 or 5 per cent of that taken by a lamp. Taking this loss into consideration, the adjuster-socket system has an efficiency of 95 or 96 per cent with all lamps burning.

The coils are so designed that lamps of increased efficiency can be used without change. The drop



WESTINGHOUSE STREET HOOD WITH TWO-PIECE REFLECTOR  
COMPLETE WITH GOOSE-NECK AND POLE PLATE  
FOR BRACKET SUSPENSION

simplify the wiring, increase the safety of the installation by reducing the amount of high-tension circuit above ground, and reduce the cost by the simplicity in the number of parts. Such systems are best controlled by the constant current moving coil regulator, because of its accuracy of regulation under any kind of abnormal condition, and the relatively high value of the incandescent lamps on a

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

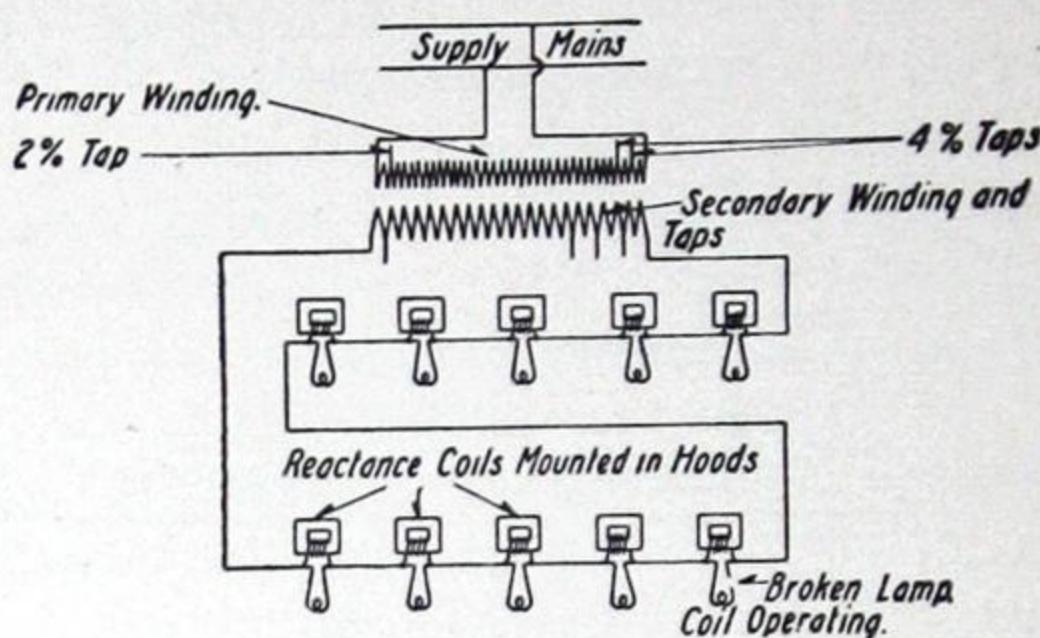
created by the coil when a lamp is out is such that the current is not greatly altered until about 20 per cent of the lamps on the circuit are out. Lamps of larger candle-power may be used with the standard reactance coils so long as the voltage per lamp does not greatly exceed the voltage of the lamp for which the coil is listed.



EYE SUSPENSION MAZDA STREET HOOD WITH ONE-PIECE REFLECTOR

**Maximum Number of Lamps**—Since the lamps are operated in series from a constant-potential source of supply, all the lamps in one circuit must be of the same ampere capacity, though not neces-

sarily of the same candle-power. The sum of the lamp voltages should equal the supply voltage. Consequently, it is necessary to use a definite number of lamps on a given supply voltage.



ADJUSTER SOCKET SYSTEM SHOWING OPERATION OF REACTANCE COILS TO REPLACE LAMPS

**Flexibility**—With the adjuster-socket system, a great flexibility is possible through the use of standard transformers. These provide several different ranges of voltages for lamp circuits. Where the supply circuit voltage differs from that for which the standard apparatus is listed or where the number of lamps would be better served by a different range of voltages, special transformers adapted to the existing conditions, can be furnished on order.

### Westinghouse Street-Series Mazda Lamps

The following table gives the size and ampere capacity of the Westinghouse Mazda lamps for use with these systems:

Current Capacity of Lamp Amperes	VOLTS AT LAMP							
	32 c.p.	40 c.p.	60 c.p.	80 c.p.	100 c.p.	250 c.p.	400 c.p.	600 c.p.
5.5	5.5	6.3	8.5	10.8	13	29.7	47.4	—
6.6	4.7	5.3	7.1	9.1	10.9	23.5	37.1	55.7
7.5	4.3	4.8	6.4	8.0	9.6	19.6	30.5	45.8

Unless there is good reason for other choice, it is recommended that the 6.6-ampere lamps be used, as this allows the use of the higher efficiency type C lamps.

### Transformers

On supply circuits up to 550 volts, it is possible to connect the lamps in series with a control switch, directly across the mains. On higher voltages, however, the supply mains should ordinarily be properly insulated from the lamp circuits by means of suitable transformers.

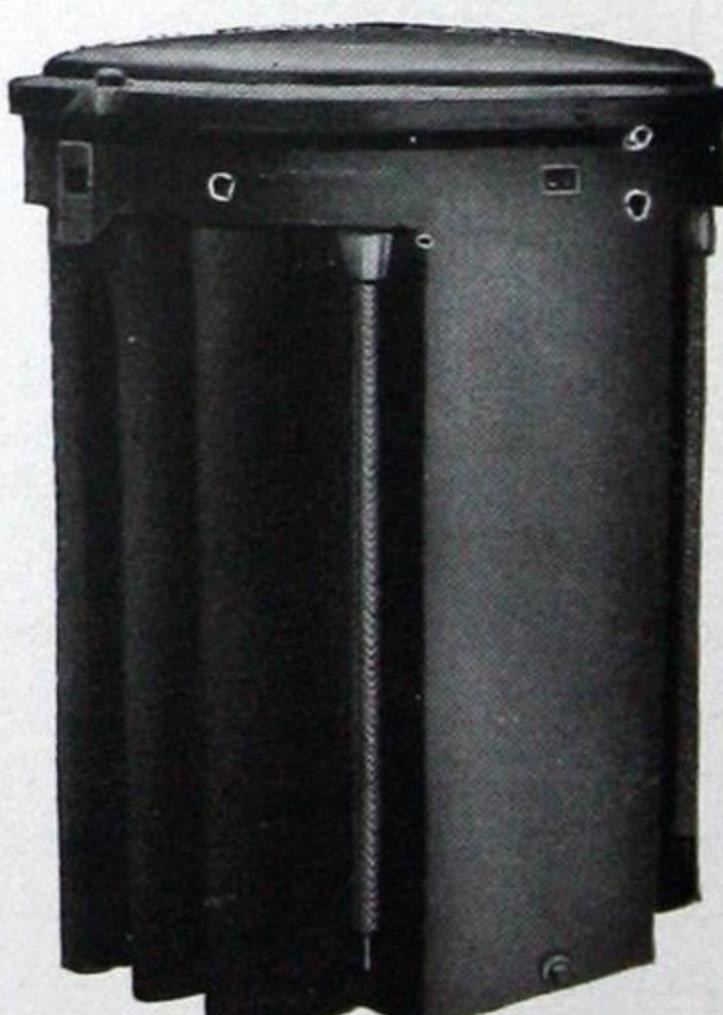
Transformers for this purpose are regularly furnished for 2200-volt supply circuits. Standard transformers are designed to feed one circuit of lamps.

All transformers are provided with weatherproof cast-iron cases suitable for indoor use, or for outdoor mounting on poles at a distance from the power station, at any advantageous point.

**Voltage Variations**—Taps are provided in the primary winding by means of which any secondary voltage may be raised 2, 4, 6, 8, or 10 per cent if operating on a 2200-volt circuit. By this arrange-

ment any voltage within one per cent of that required by the circuit may be obtained. All taps on both windings are brought to terminal blocks, inside the transformer case. No soldered connections need to be changed in adjusting taps.

**Regulation**—As lamps go out and the adjuster socket coils take their place in the circuit, the current will never rise over 2 per cent above normal, this point being reached with from 10 to 15 per cent of the lamps out.



TRANSFORMER FOR ADJUSTER SOCKET SYSTEM

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

## Transformers for Adjuster-Socket System

Style number includes only transformer mounted in weatherproof case without oil, fuse blocks, or hanger irons. List price includes necessary oil, two hanger irons, and two fuse blocks, Style No. 29865-B or 147190.

## Primary Voltage, 2200-2100-2000; 6.6-Ampere Secondary

Style No.	Capacity Amperes	Frequency Cycles	SECONDARY VOLTAGE	Gals. of Oil	Style No. Hanger Irons	Approx. Ship. Wt. of Transformer Lbs.	List Price
219131	6.6	60	87	160	109712	98	\$ 88 00
219132	6.6	60	137	250	109712	121	100 00
219133	6.6	60	215	395	109712	158	120 00
219134	6.6	60	338	625	109713	230	145 00
219135	6.6	60	435	800	109713	256	165 00
242015	6.6	60	620	1140	109713	355	200 00
219136	6.6	60	823	1500	109713	450	295 00
219137	6.6	60	1250	2300	109733	570	340 00
219138	6.6	25	69	126	109713	230	105 00
219139	6.6	25	103	190	109713	255	125 00
219140	6.6	25	175	320	109713	435	145 00
219141	6.6	25	343	630	109714	750	310 00
219142	6.6	25	518	950	109714	1000	375 00
219143	6.6	25	872	1600	109715	1550	525 00
219144	6.6	25	1250	2300	129384	2300	750 00

Transformers for 6600 volts similar to the above can be furnished at an additional list price of \$40.00 which will not include fuse blocks. The taps will be similarly arranged except that the minimum tap will be approximately 65 per cent of the maximum voltage on the secondary circuit of the 6600-volt class.

## Fixtures For External Wiring

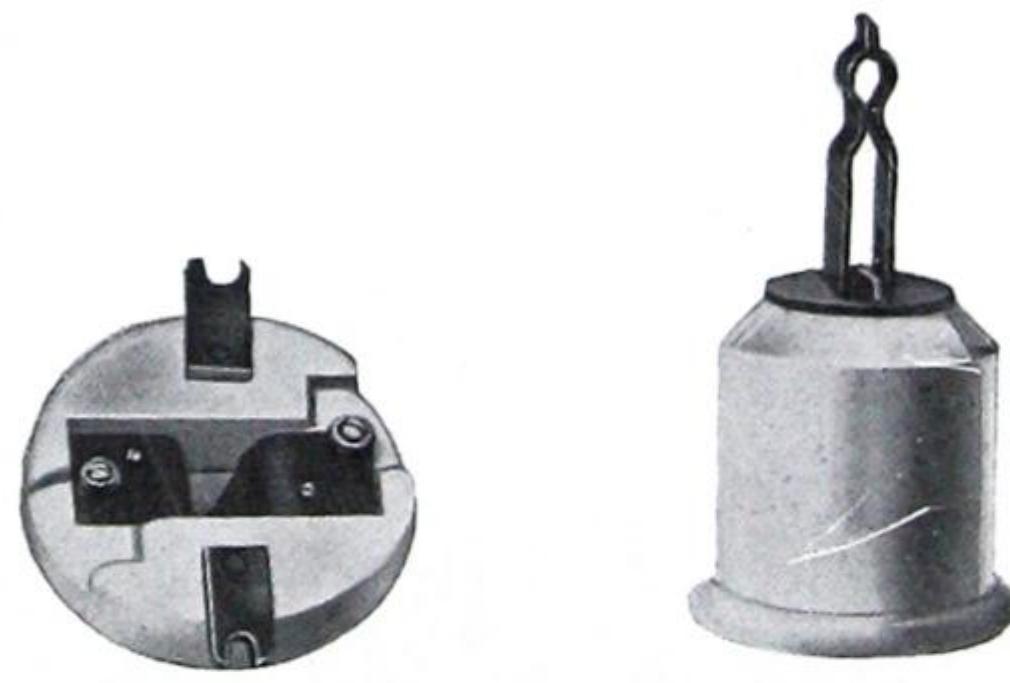
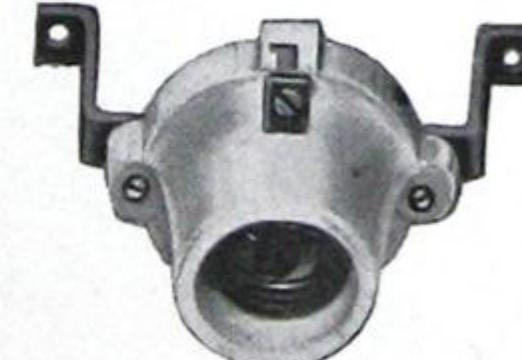
The hood support consists of an iron yoke, which clamps around the groove of the upper insulator. Three patterns of yoke are supplied. One is provided with a threaded socket on top for screwing on a  $\frac{3}{4}$ -inch gas-pipe goose-neck bracket. Another has arms terminating in clamps for attaching to a span-wire. By means of these adjustable clamps the hood can be made to hang vertically regardless of the side strain of the connecting wires. A third has an eye to hang from some type of lowering gear, thus permitting easy renewal of lamps hung in inaccessible places. The hood casting is protected by a coat of special asphaltum paint and is designed to shed all water, either rain or melted snow. It is light, strong, and free from parts liable to derangement. It requires no adjustments whatever, and no attention except that which is necessary

On account of excessive weight and cost, it is impracticable to furnish the two-piece reflector for the larger tungsten lamps. For lamps of 250 candle-power and over, the 22-inch single-piece reflector, which is of excellent material and gives the most effective distribution, is supplied. A similar 18-inch reflector can be supplied when a cheaper fixture than that equipped with the two-piece reflector is wanted.

The reactance coil or the film cutout, as the case may be, is located in the interior of the hood, where it is held in place by a metal strap screwed to lugs on the interior surface of the main casting.



REACTANCE COIL AND RECEPTACLE



LAMP CUTOUT RECEPTACLE

for renewing the lamps. Hoods are supplied, suitable for either single-piece or two-piece reflectors. These hoods are similar but not interchangeable. The two-piece reflector has a conical top for shedding snow or rain. Enamelled inside and outside to prevent any rusting, and made throughout with the best materials and workmanship, this reflector has proved itself to be without an equal. It is made 18 inches diameter only, this size being satisfactory for any lamp of 100 candle-power or less.

The street hood is a hollow bell-shaped main casting with two hollow arms projecting from its upper part at right angles to its axis. The top of the main casting terminates in an insulator pin which carries a supporting insulator of the triple-petticoated type. The other ends of the projecting arms support the small insulators which carry the incoming and out-going ends of the line wire. All insulators are of brown finished porcelain of the best grade. The lamp leads pass through holes in the under sides of the arms to screw terminals within the main casting. Every effort has been made to

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

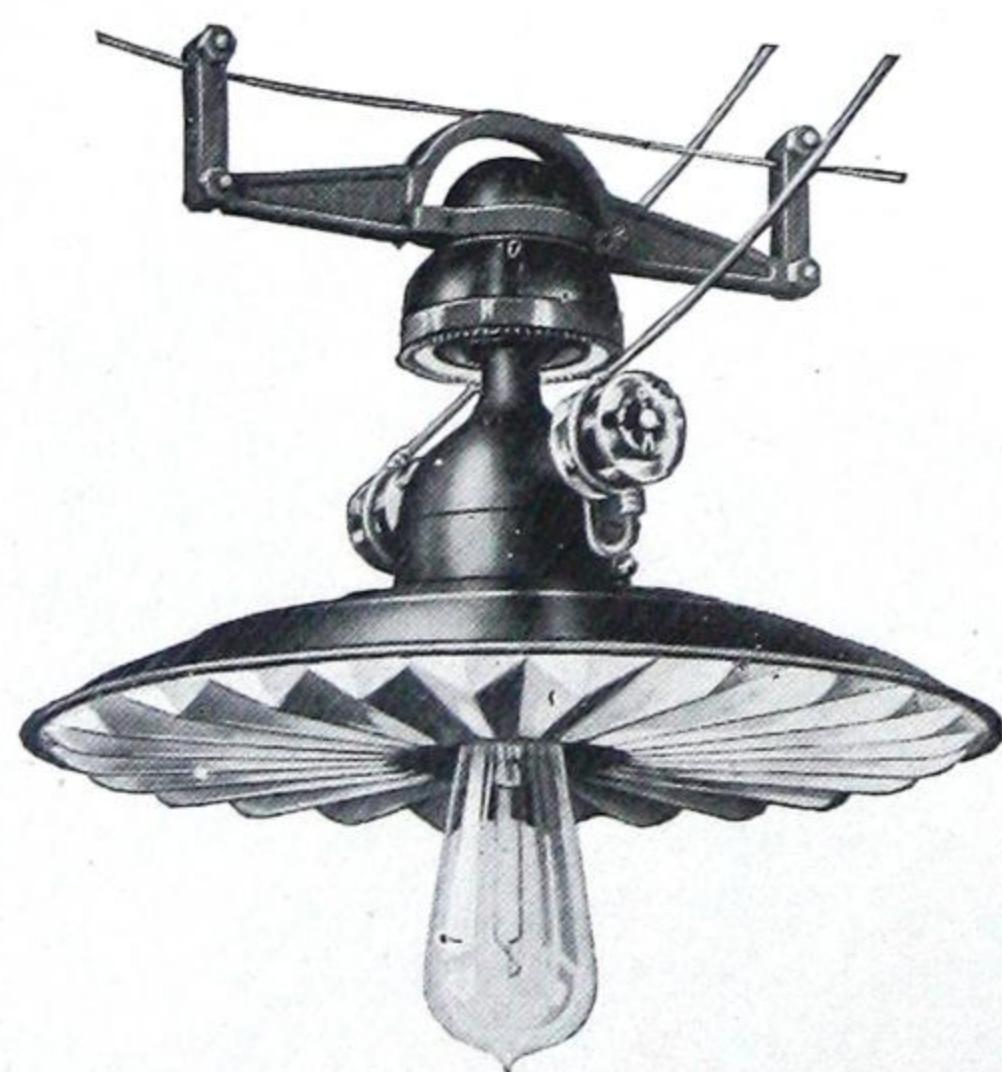
render installation easy, the hood being wired completely with flexible cable when shipped. The parts and binding screws are substantially proportioned so that they will withstand the rough usage to which they often are subjected.

The reflector is of the radial type and has a reflecting surface of white enamel, consisting of thirty radial prismatic corrugations. It is designed to distribute the light over a wide area.

The lamp cutout used in the regulator system for maintaining the continuity of the circuit in case of lamp burnouts, or renewals, is of the film cutout type. It consists of a porcelain receptacle having two spring clips specially reinforced, which form part of the electric circuit, fastened in the interior of the hood by means of two short straps. A detachable porcelain lamp socket provided with two spring clips similar to those in the receptacle complete the device. A small insulating film is placed between the clips of the socket.

When the socket is plugged into the receptacle, the socket clips press the receptacle clips apart, thus breaking the circuit through the latter and causing the current to pass through the lamp. If the lamp burns out, the increase of potential across the clips punctures the film between the socket clips and short circuits the lamp. A special spring switch in the bottom of the socket allows the lamp to be unscrewed without opening the circuit or puncturing the film.

In case the socket is withdrawn for the insertion of a new lamp and film, the clips of the receptacle come together and maintain the continuity of the circuit through the street hood. The regulators or reactance coils maintain the normal lamp current on the circuit regardless of the number of lamps out of operation.



FOR CABLE SUSPENSION

WESTINGHOUSE MAZDA STREET HOODS WITH TWO-PIECE REFLECTORS

Street hoods for multiple lamps can be furnished by simply substituting a Style No. 9428 socket mounted on a special bracket to hold the lamp in the correct position. Any of the standard hoods may be furnished with this type of socket for the small or large Edison base lamps. The hoods may be readily changed to the film-cutout or adjuster-socket system by replacing the multiple socket and its bracket with

the proper parts. It should be noted that the 25-cycle coils and those for the 250 and 400 candle power lamps on 60-cycles are installed in a larger sized casting than the film cutout sockets and other adjuster socket coils.

## Fixtures For Concealed Wiring

These fixtures are designed to meet the demand in many residential districts for concealed-wiring street hoods and brackets in connection with underground wiring.

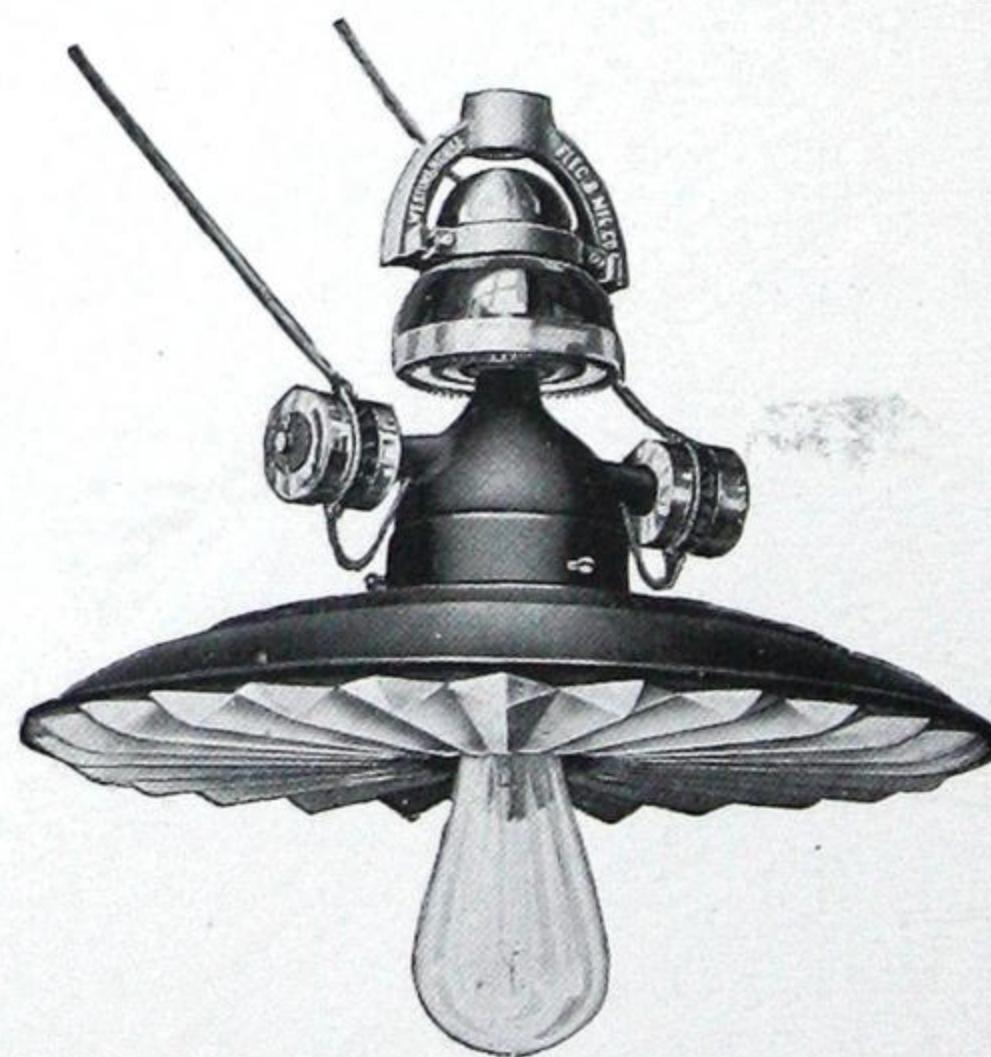
The brackets may be used in connection with street hoods for external wiring, where a heavier or more rigid bracket is desired.

Two designs of brackets can be furnished as shown. They are made of the best grade of 1 1/4-inch wrought-iron pipe, smooth, and free from sharp inward projections tending to injure wires or cable drawn through them. The pole plate is attached to the pole by three lag screws and is properly curved to closely fit the pole.

Either of two designs of hoods may be furnished for use with either bracket. One hood is for use with a standard Westinghouse 18-inch or 22-inch single-piece reflector and the other with a Westinghouse two-piece reflector. The hoods are similar in design to those for external wiring except that the side brackets with insulators are omitted, the yoke for screwing on the bracket is threaded for 1 1/4-inch pipe, and the petticoat insulator supporting the hood has a hole through its center, allowing the wires to run through it from the bracket to the socket.

These hoods are furnished without wiring, it being customary for the user to insulate the wire to the same extent in the bracket as in other parts of the line. The fixture is very simple and easy to wire.

The various film cut-out sockets and receptacles,



FOR BRACKET SUSPENSION

reactance coils, and multiple sockets used in the externally wired hoods are used in the concealed wiring hoods.

Standard concealed wiring hoods are adapted for attachment to 1 1/4-inch pipe only.

The 18-inch and 22-inch single-piece reflectors are interchangeable on any hoods to which they are adapted.

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

## STREET HOODS FOR ADJUSTER SOCKET SYSTEM

List price includes hood complete with reflector, reactance coil and large Edison base socket. Lamp bracket is not included.

## For External Wiring—With 6.6-Ampere Reactance Coils

## Two-Piece 18-Inch Reflector (Style No. 120391)

Style No.	Frequency Cycles	Type of Suspension	Candle Power Rating of Lamp	Approx. Shipping Wt. of Hood and Reflector	List Price Each
219261	60	Cable	32 or 40-60	35	\$14 00
219262	60	"	80-100	35	14 60
219292	25	"	32 or 40-60	41	18 50
219293	25	"	80-100	41	19 75
219265	60	Bracket	32 or 40-60	33	13 25
219266	60	"	80-100	33	14 25
219288	25	"	32 or 40-60	39	17 60
219289	25	"	80-100	39	19 75

## Single-Piece 18-Inch Reflector (Style No. 176964)

219269	60	Cable	32 or 40-60	25	13 50
219270	60	"	80-100	25	14 00
219290	25	"	32 or 40-60	33	16 00
219291	25	"	80-100	33	20 00
219273	60	Bracket	32 or 40-60	23	11 75
219274	60	"	80-100	23	13 50
219286	25	"	32 or 40-60	31	15 50
219287	25	"	80-100	31	19 00

## Single-Piece 22-Inch Reflector (Style No. 176965)

219271	60	Cable	250	34	21 00
219272	60	"	400	34	23 50
219275	60	Bracket	250	32	19 50
219276	60	"	400	32	22 50

Adjuster socket systems can be furnished for different current on special order.

For galvanizing standard hoods add to list price of standard hood lots of less than 50, \$1.50  
lots of 50 or more, \$1.30

## For Concealed Wiring—With 6.6-Ampere Reactance Coils

## Two-Piece 18-Inch Reflector (Style No. 120391)

Style No.	Frequency Cycles	Candle-Power Rating of Lamp	Approx. Shipping Wt. of Hood and Reflector	List Price Each
219277	60	32-40-60	31	\$12 50
219278	60	80-100	31	13 75
219297	25	32-40-60	37	16 00
219298	25	80-100	37	19 50

## Single-Piece 18-Inch Reflector (Style No. 176964)

219279	60	32-40-60	23	11 00
219280	60	80-100	23	12 75
219299	25	32-40-60	29	15 00
219300	25	80-100	29	18 50

## Single-Piece 22-Inch Reflector (Style No. 176965)

219281	60	250	32	18 50
219282	60	400	32	21 50

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

## Reactance Coils for Adjuster-Socket Street Hoods

## (Coils Complete with Iron)

Style No.	Frequency Cycles	Amperes	Candle Power Rating	Approx. Shipping Wt.	List Price
219160	60	6.6	32-40-60	4	\$ 6 25
219161	60	6.6	80-100	5	7 00
219162	60	6.6	250	7	8 75
219163	60	6.6	400	9	10 75
219164	25	6.6	32-40-60	6	7 50
219162	25	6.6	80-100	7	8 75

## REGULATOR SYSTEM

In the regulator system, the series of lamps is supplied from a constant-current regulating transformer. This automatically controls the current and voltage of the circuit, and maintains a constant current regardless of the number of lamps burning. When a lamp burns out, a film cut-out device, consisting of a receptacle and socket located in the street hood, short-circuits the lamp, and thus maintains the continuity of the circuit. The receptacle is so constructed that the series socket and lamp can

be removed by a sharp pull, or the lamp can be unscrewed, at any time without opening the circuit. Complete descriptions of the street hoods used with the regulator and the adjuster-socket systems are given on other pages of this catalogue with illustrations showing their application.

**Regulators**—The regulators used with this system are described and listed on other pages of this catalogue.

## STREET HOODS WITH FILM CUTOUTS FOR REGULATOR SYSTEM

List price includes hood complete with reflector, film cutout, and large Edison-base lamp socket. List price does not include gooseneck or pole plate. **In ordering, socket and reflector must be specified separately.**

## For External Wiring

## Two-Piece 18-Inch Reflector (Style No. 120391)

Style No.	Type of Suspension	Socket Style No.	Approx. Shipping Wt. Complete	List Price Each
120371	Cable	77303	31	\$9 40
120372	Bracket	77303	28	9 00
199248	Eye	77303	28	9 00

## Single-Piece 18-Inch Reflector (Style No. 176964-A)

178680	Cable	77303	23	8 40
178682	Bracket	77303	20	8 00
199249	Eye	77303	20	8 00

## Single-Piece 22-Inch Reflector (Style No. 176965-A)

178681	Cable	77303	24	9 00
178683	Bracket	77303	21	8 60

## For Concealed Wiring

## Two-Piece 18-Inch Reflector (Style No. 120391)

191188		29	8 50
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## Single-Piece 18-Inch Reflector (Style No. 176964)

191189		20	7 50
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## Single-Piece 22-Inch Reflector (Style No. 176965)

191190		21	8 25
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†Hoods for eye-suspension have the same price as similar hoods for bracket suspension.

For galvanizing standard hoods add to list price of standard hood { lots less than 50, \$0.85.  
lots of 50 or more, 0.65.

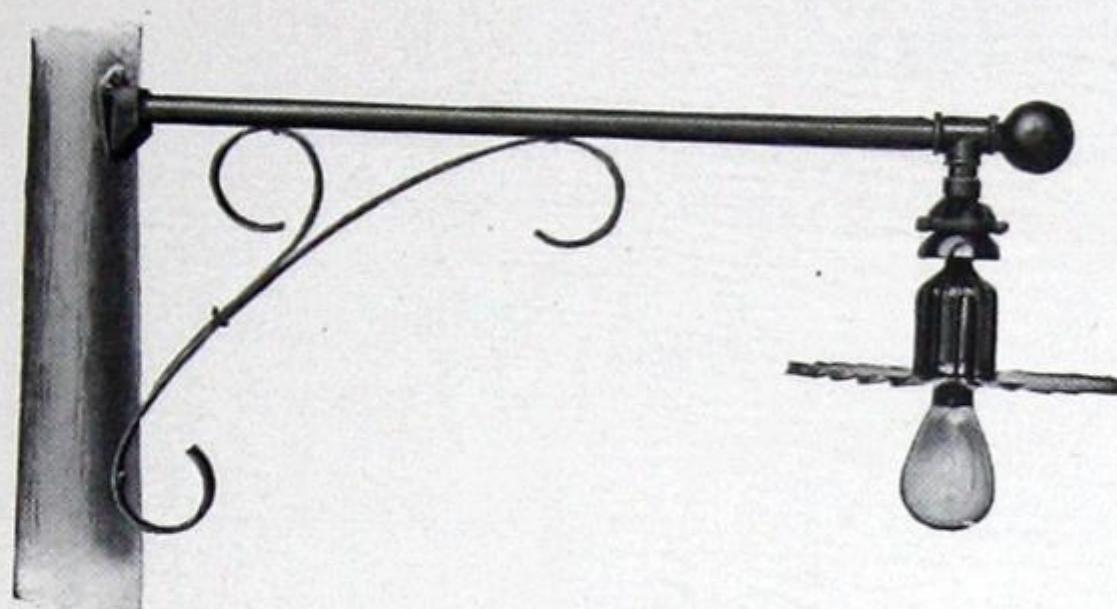
For similar hoods equipped with multiple sockets deduct from regular list price of film cutout hoods, for small Edison-base lamps less than 25, \$0.65, 25 or more, \$1.00. For large Edison base lamps less than 25, \$0.35; 25 or more, \$0.65.

These hoods and cutouts are suitable for any commercial frequency and any line current up to 10.0 amperes.

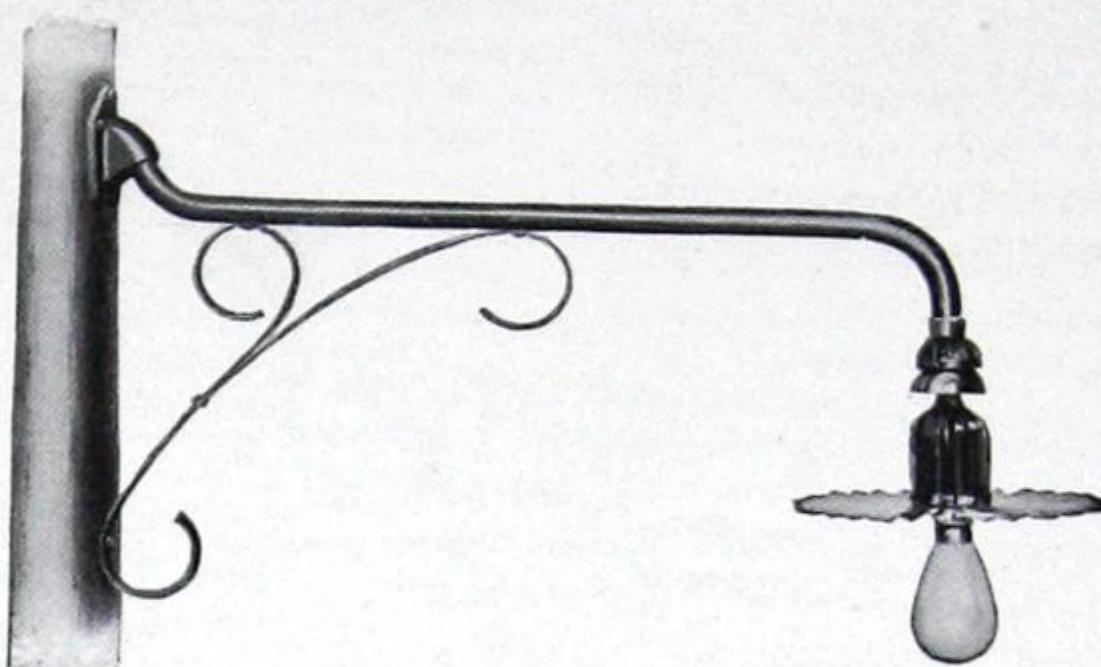
**Order by Style Number**

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

## ACCESSORIES



BRACKET STYLE No. 191199 AND SCROLL STYLE No. 191201



BRACKET STYLE No. 191200 AND SCROLL STYLE No. 191201

## Brackets for External Wiring

Style number and list price include a 4-foot wrought-iron  $\frac{3}{4}$ -inch-pipe gooseneck bracket fitted with a three-hole curved pole plate. Standard pipe and plate are painted with black asphaltum. § Bracket lengths greater than four feet can be furnished at an addition to above list price of \$0.20 for each additional foot. In ordering be specific in stating the exact length of bracket desired. Measure from face of pole to outer end of bracket.

Style No.	Approx. Shipping Weight, Lbs.	List Price
120384	9	\$1 40

## Brackets for Concealed Wiring

List price includes a 4-foot wrought iron  $1\frac{1}{4}$ -inch bracket with three-hole curved pole plate. Supporting scroll must be ordered separately. The fixture is painted with black asphaltum.

Style No.	Description	Approx. Shipping Wt., Lbs.	List Price
191199	Straight-Arm Bracket	20	\$4 00
191200	Double-Curved Bracket	20	3 50
191201	Supporting Scroll	5	1 75

NOTE—When it is desired to use these brackets with Westinghouse standard externally wired hoods the hooks may be supplied with top clamp having  $1\frac{1}{4}$ -inch casting without extra cost.

§For galvanized bracket add to list price of standard bracket { lots of less than 50, \$0 60  
{ lots of 50 or more, 0 50

## Miscellaneous Accessories

		List Price
77303	Film-cutout socket, only	\$1 10
183592	Receptacle for film-cutout socket without mounting straps	90
*	Set of mounting straps	15
120395	Complete film-cutout socket and recept- acle without mounting straps	2 00
219375	Large Edison-base multiple socket (for adjuster-socket hoods)	1 10
9428	Small Edison-base multiple socket (for adjuster-socket hoods):	35
176964	18-inch single-piece reflector only—approx. wt. lbs. 6	2 00
176965	22-inch single-piece reflector only—ap- prox. wt. lbs. 7	2 50
120391	18-inch two-piece reflector only—approx. wt. lbs. 14	3 00

## INSULATING FILM

## For Street Hoods for Regulator Systems

Style number and list price include an insulating film for use with series sockets.

This film consists of two thin copper discs  $\frac{1}{2}$ -inch in diameter with insulation between them. This insulation will break down at from 350 to 400 volts, thus permitting the flow of current when the lamp burns out.

Style No.	List Price per 100
124347	\$1 20

\*Order by description of hood.

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

OUTLINE DIMENSIONS  
Street Hoods and Brackets  
For External Wiring

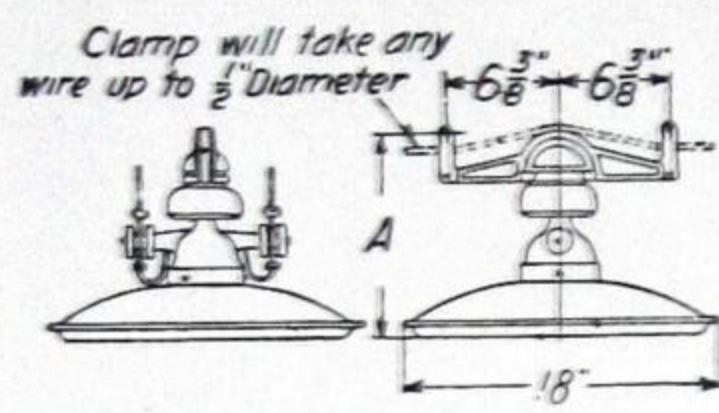


FIG. 1—CABLE SUSPENSION

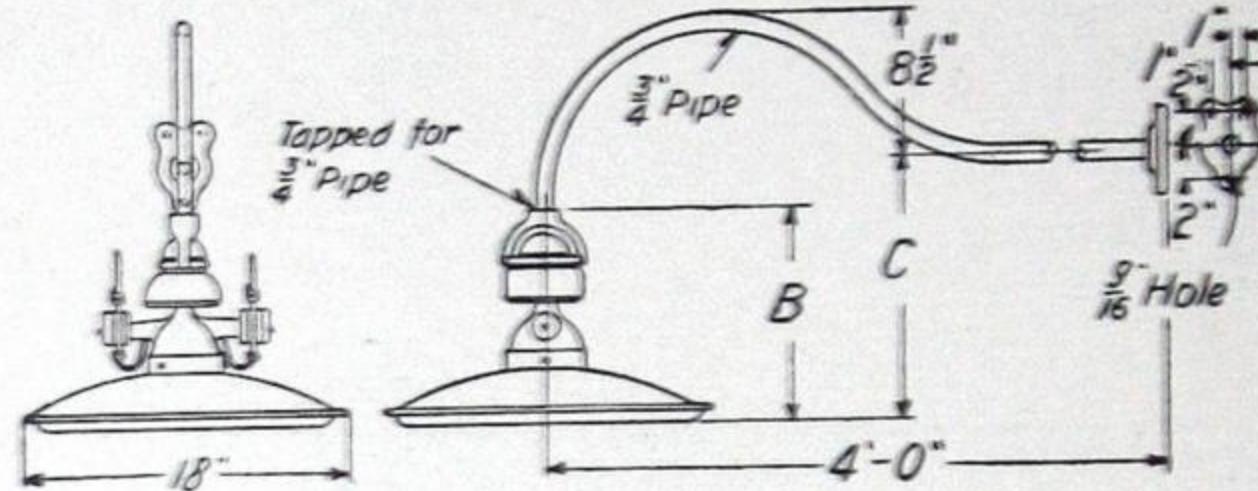


FIG. 2—BRACKET SUSPENSION

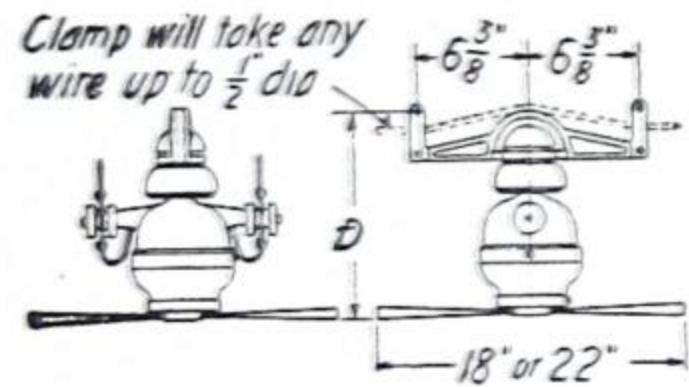


FIG. 3—CABLE SUSPENSION

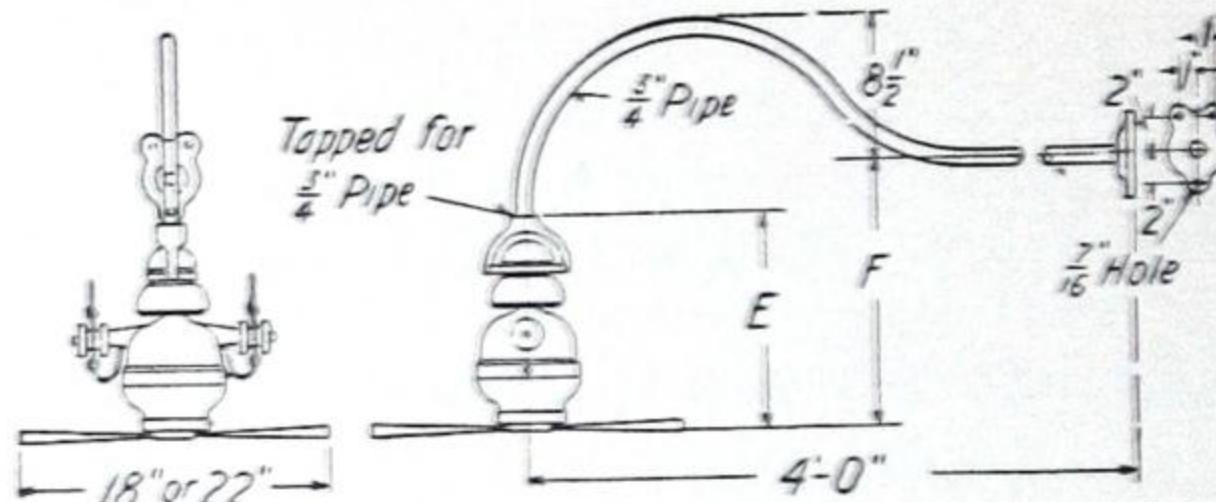


FIG. 4—BRACKET SUSPENSION

System	Frequency Cycles	DIMENSION—INCHES					
		TWO-PIECE REFLECTOR			SINGLE-PIECE REFLECTOR		
		Fig. 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5	Fig. 6
Adjuster-Socket	*60	11 3/4	12 1/8	14 7/8	11 3/4	12 1/8	14 7/8
Adjuster-Socket	†25	12 3/8	12 5/8	15 3/8	12 3/8	12 5/8	15 3/8
Regulator	60	11 3/4	12 3/8	14 7/8	11 3/4	12 1/8	14 7/8
Regulator	25	11 3/4	12 1/8	14 7/8	11 3/4	12 1/8	14 7/8

\*32, 40, 60, 80, 100-candle-power lamps.

†Also 250 and 400-candle-power lamps.

## For Concealed Wiring

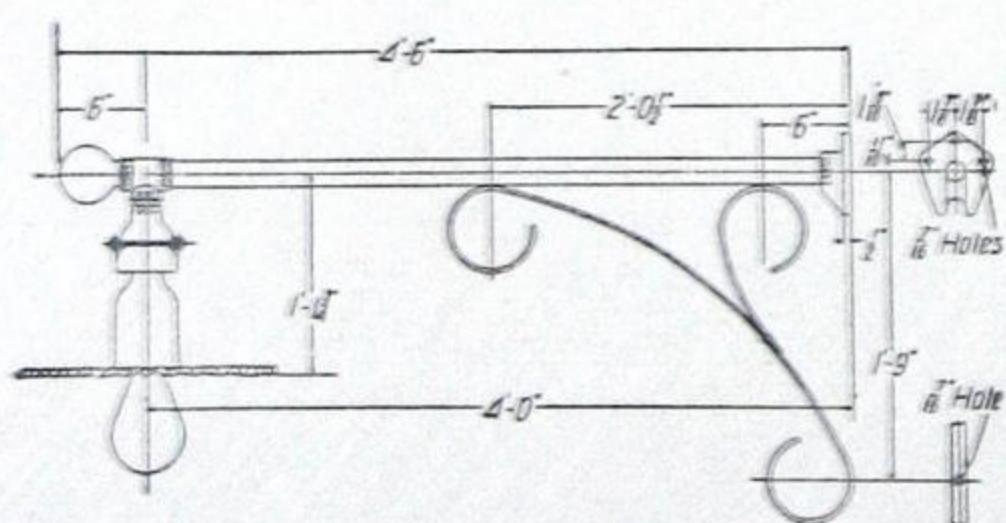


FIG. 5—BRACKET STYLE No. 191199 AND SCROLL STYLE No. 191201

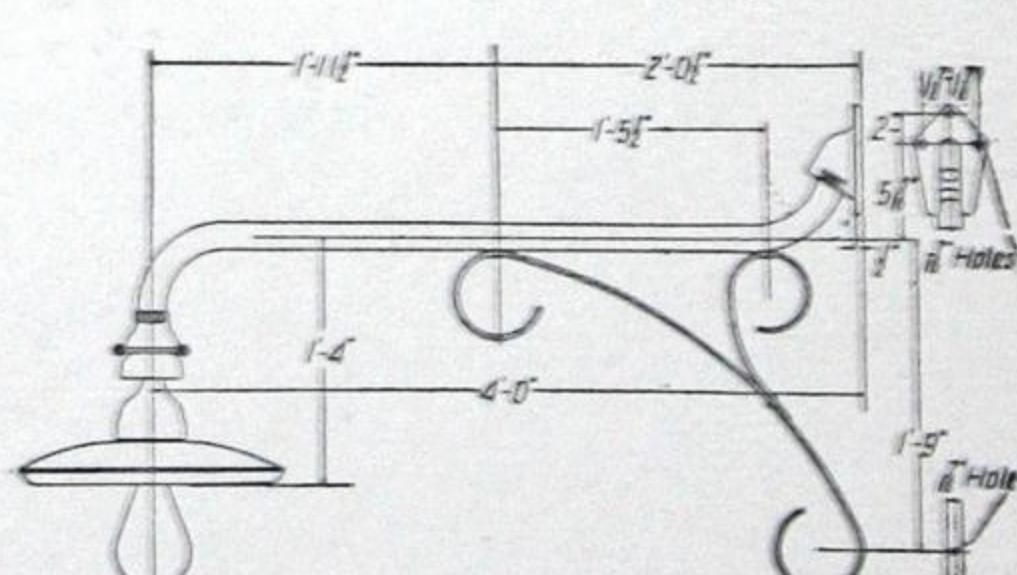


FIG. 6—BRACKET STYLE No. 191200 AND SCROLL STYLE No. 191201

These dimensions are for reference only. For official dimensions apply to the nearest district office.

## SERIES MAZDA STREET LIGHTING SYSTEMS—(DS782)—Continued

## OUTLINE DIMENSIONS

## Transformers for Adjuster-Socket System

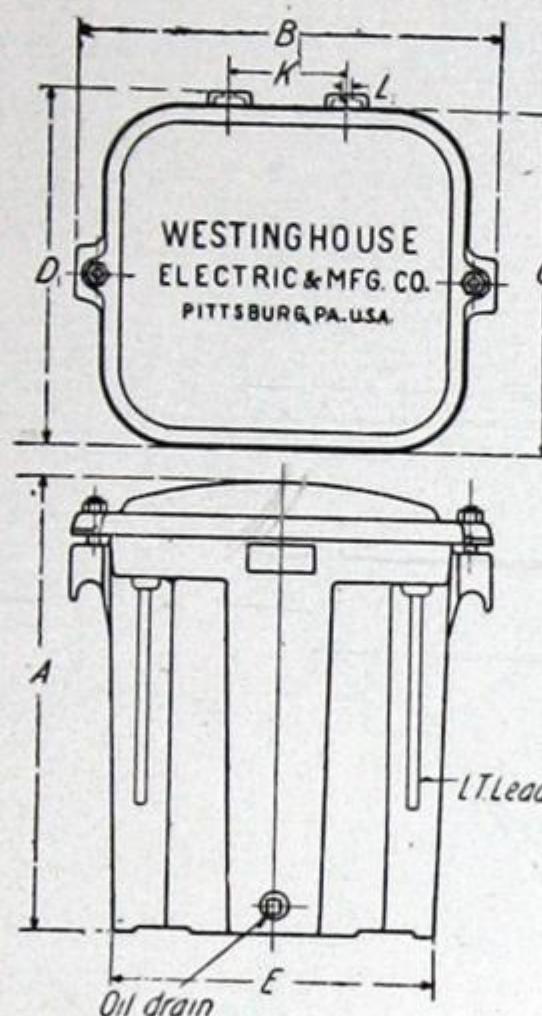


FIG. 7

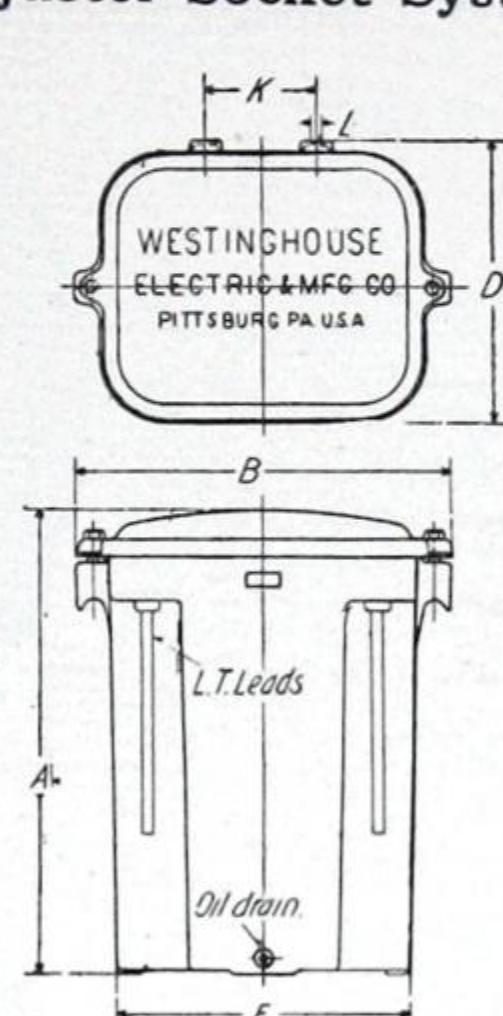


FIG. 8

## Hanger Irons for Transformers

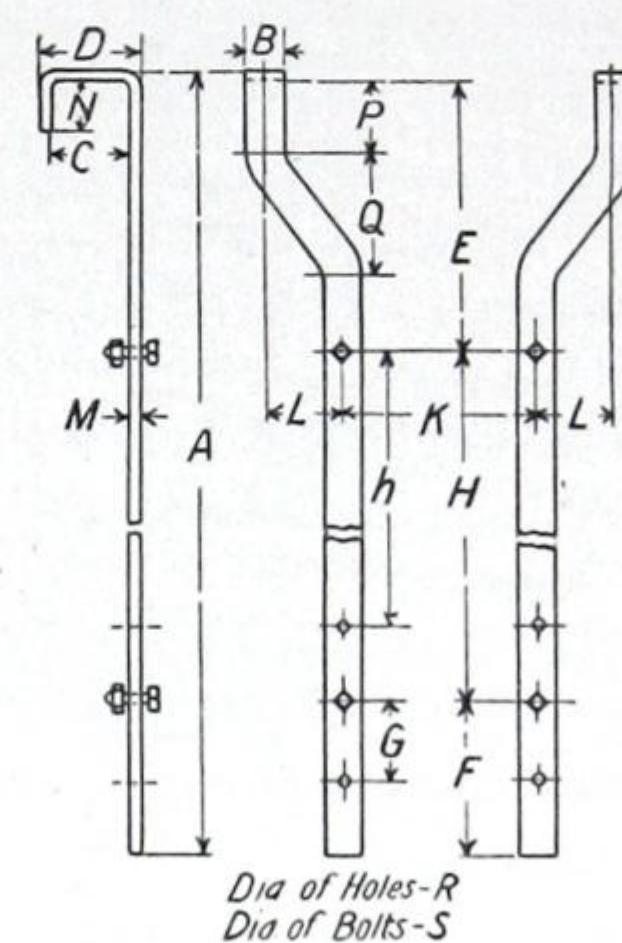


FIG. 9

## TRANSFORMER DIMENSIONS

Style No.	Fig. No.	DIMENSIONS—INCHES										
		A	B	C	D	E	F	G	H	K	L	
219133	7	14 1/4	13 1/2	11 1/8	11 3/8	10 1/2	9 3/4	3 5/8	7	4 3/4	7/16	
219138	7	15 7/8	13 7/8	11 3/4	11 15/16	10 7/8	10 3/8	4	7	4 3/4	7/16	
219139	7	20 3/16	16 1/4	13 3/8	13 3/4	12 3/8	11 5/8	4 3/8	10	3 3/4	9/16	
219135	7	23 7/8	17 1/4	14 13/16	15 1/8	13 3/16	12 7/8	2 7/8	16	5	9/16	
219140	7	27 7/8	18 1/2	16 3/16	16 1/4	13 11/16	13 11/16	4 7/8	16	5	9/16	
242015	7	32 1/8	20 1/4	16 7/8	17 1/4	15 3/4	14 1/2	7 1/8	16	5	9/16	
219136	7	12 1/2	12 1/2	9 3/4	10	9 7/16	8 5/16	2 7/8	7	4 3/4	7/16	
219132	7	13	12 7/8	10 3/8	10 5/8	9 13/16	9 15/16	2 1/2	7	4 3/4	1 1/16	
219134	7	17 3/4	16 1/4	13 3/8	13 3/4	12 3/8	11 5/8	3 1/2	10	3 3/4	9/16	
219143	8	33	29 1/2	21 1/4	21 5/8	23 1/16	18 5/16	4	21	8 3/4	1 1/16	
219144	8	38 3/8	32 3/4	24	24 1/2	26 3/8	21 1/8	4 3/8	24	9 3/4	3/4	

## HANGER IRON DIMENSIONS

Style No.	Fig.	DIMENSIONS—INCHES														Approx. Net Weight Per Pair Lbs.			
		A	B	C	D	E	F	G	H	h	K	L	M	N	P	Q	R	S	
109712	9	28 1/4	1 1/4	4	4 1/2	12	2 1/2	7	10	*	4 1/2	1/4	1 3/4	1	7	7/16	3/8	6	
109713	9	33 7/8	1 3/4	4	4 3/4	10 3/4	6 3/4	5 3/4	16	*	4 1/2	3/8	1 5/8	1	7	9/16	1/2	15	
109733	9	43 3/8	1 3/4	4	4 3/4	11 1/2	1 1/2	...	16	*	4 1/2	3/8	2 1/8	1	7	9/16	1/2	18	
109714	9	43 1/2	2 1/4	4	5	11 1/2	10 1/2	9	21	18	*	4 1/2	1/2	2	1	7	13/16	3/4	32

\*For spacing of hangers see dimensions "K" of transformers.

These dimensions are for reference only. For official dimensions apply to the nearest district office.

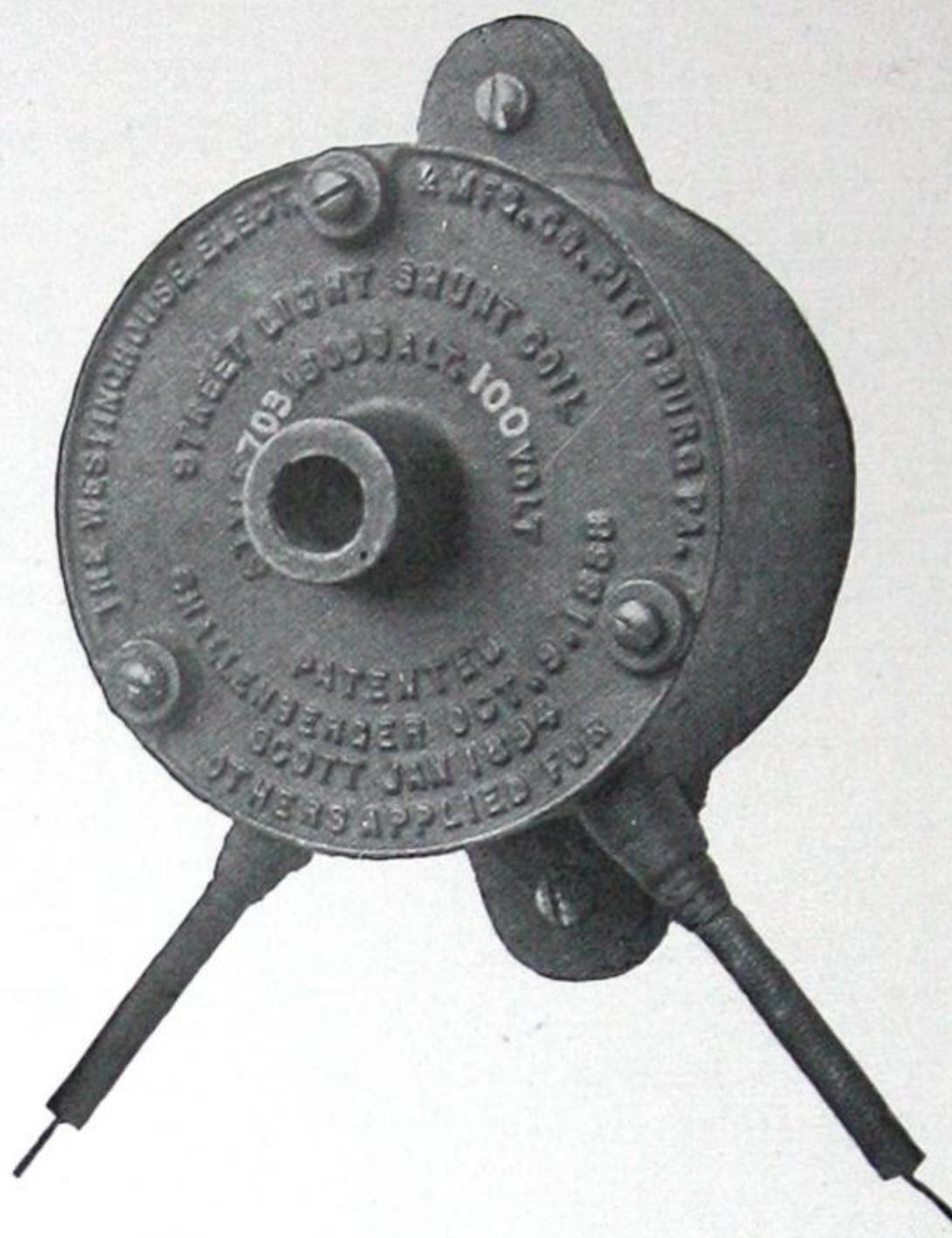
## SHUNT COILS FOR INCANDESCENT LAMPS—(DS785)

### FOR INCANDESCENT STREET-LIGHTING SYSTEMS

**Application**—On constant-potential street lighting systems, or where several incandescent lamps are operated in series on a constant potential supply, a means must be provided to prevent interruption of the other lamps, if one lamp in the series burns out or is removed, and to prevent excess voltage on the remaining lamps.

The shunt coils here listed are intended for this purpose. They are entirely automatic in action, not depending on the operation of magnets, fusible connections, movable contacts, or any moving parts whatever, and therefore cannot get out of order.

**Construction and Operation**—The shunt coil consists of a single coil of wire, wound on an iron core and enclosed in an iron weatherproof box. A coil is permanently connected in shunt across the terminals of each lamp in the circuit. When the lamp is burning, the impedance of the coil is such that it takes a negligible amount of current, the major portion of the line current going through the lamp. Should the lamp be eliminated from the circuit, the line current is forced through the shunt coil, and the increased current thoroughly saturates the magnetic circuit and builds up a counter-electromotive force equivalent to that of the lamp voltage. By this means the voltage drop of the circuit remains the same, and the lamps in the circuit are not subjected to increased voltage. The energy consumed by the coil when the lamp is burning is only a very small percentage of that used by the lamp, so that the efficiency of the system remains high. The shunt coil forms a very simple and economical device for automatically taking care of the removal of an incandescent lamp from a series circuit. It may be used with 25, 32, or 50-candle-power carbon filament lamps, or with Mazda C lamps.



SHUNT COIL STYLE No. 703

#### Shunt Coils Complete For Carbon Filament Lamps

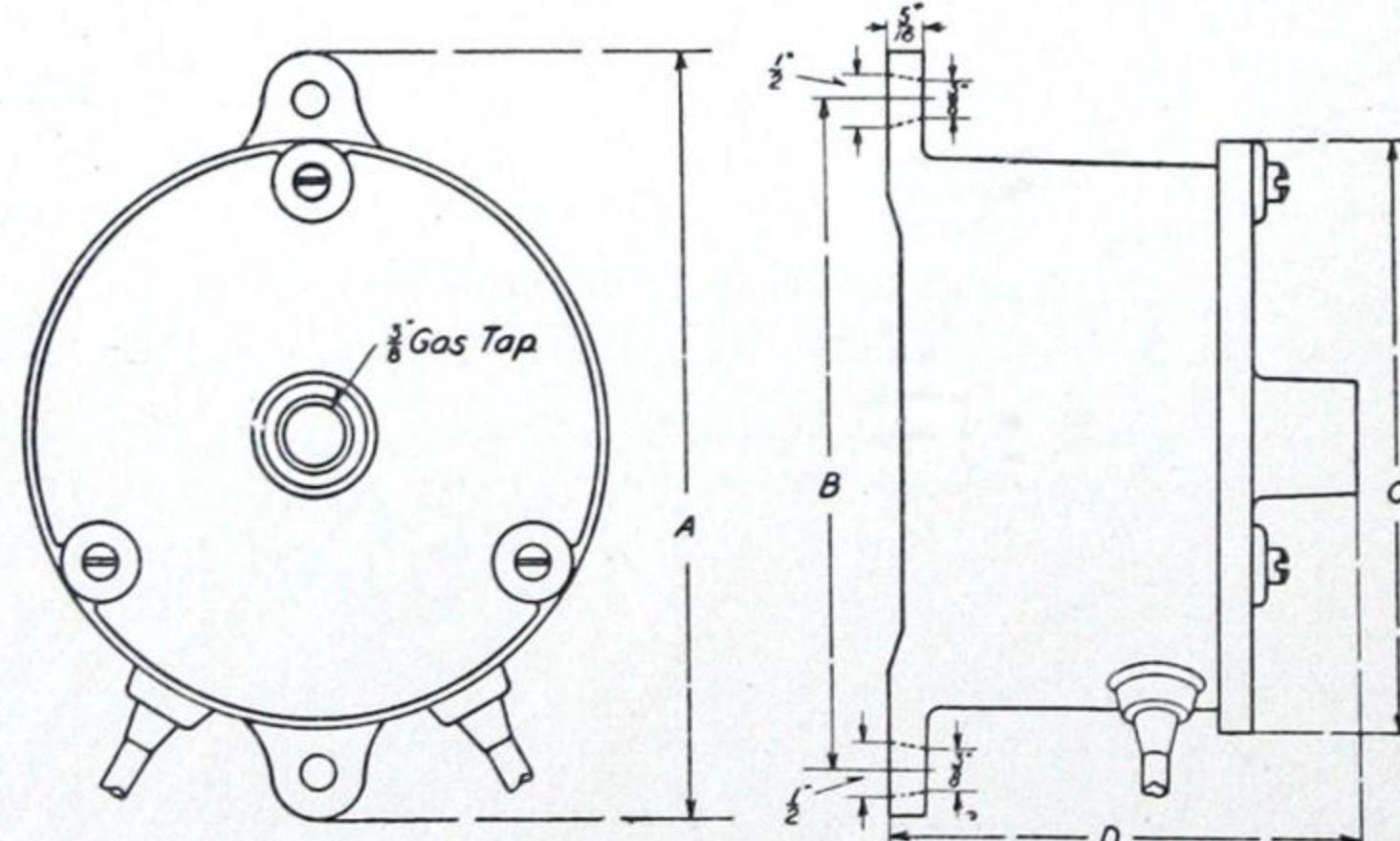
Style number and list price include the coil complete in weatherproof case.

Style No.	Voltage Per Lamp	Cycles	Shipping Weight	List Price
702	50	133	8	\$ 9 00
703	100	133	8	9 50
704	50	60	10	11 00
705	100	60	10	12 50

#### Shunt Coils Complete For Mazda "C" Lamps

Style No.	Candle Power	Amperes of Lamp	Frequency Cycles	Shipping Weight	List Price
246440	32-40-60	6.6	60	8	\$ 9 50
246441	80-100	6.6	60	8	10 50
246442	250	6.6	60	10	13 75

#### Outline Dimensions



Style No.	A	B	C	D	DIMENSIONS IN INCHES	APPROXIMATE WEIGHT
246440-246441-702-703	6 1/4	5 3/8	4 1/2	3 7/8		Net 6 1/2
246442-704-705	7	6 1/8	5 1/4	4 5/16		Boxed 8

These dimensions are for reference only. For official dimensions apply to the nearest district office.

**Order by Style Number.**

## SHEDD SAFETY AUTOMATIC SERIES CUTOUT—(DS784)

This is a device for protecting series street lighting circuits in case any portion becomes ruptured. Frequently an open circuit occurs on a series street lighting circuit, which not only causes an interruption of the entire circuit, but also endangers the lives of the public, owing to the high-tension currents employed.

The Safety Automatic Series Cutout is used to cut down outages and to prevent accidents. It is a simple, effective means for automatically disconnecting a defective portion of a series circuit, while still keeping the remainder of the circuit in operation. It can be used on alternating-current or direct-current circuits or on circuits fed by rectifiers.

### A Few of the Many Advantages the Cutout Introduces, Are:

- It prevents outages.
- It is good insurance.
- It prevents accidents.
- It locates the fault automatically.
- It automatically disconnects the ruptured circuit thus eliminating the danger of live wires.

The defective circuit can be repaired and put in normal operation without shutting down the circuit.

By connecting several circuits into one of larger capacity, and protecting the loops with automatic cutouts, considerable wire can be removed and line losses reduced.

The number of switchboards and regulators at the station can be reduced to a minimum, thus reducing cost of station equipment and making room for additional apparatus when required.

It is just the thing for long series Mazda circuits, allowing a single circuit to be spread over a far wider area than is practical with the present methods.

**Construction**—As shown in Fig. 1, the apparatus is enclosed in a case so designed as to withstand all weather conditions, as well as to prevent the entrance of dust and insects. Hangers are furnished for mounting the case on a pole like a transformer. Fig. 2 shows a front view of the apparatus with cover removed. Ample air space is left between all parts of the device and the inside surface of the case, thus preventing the grounding of the enclosed apparatus if from any cause the case itself should become grounded.

An electro-magnetic circuit controller is mounted upon a suitable insulating slab. The magnet core carries at its lower end a cross-bar supporting laminated copper contacts at either end, which are thoroughly insulated from each other by a high-tension porcelain insulator. These contacts normally rest upon the flat contact plates mounted upon the rear of the two large porcelain insulators, these insulators being firmly attached to the supporting slab. Below and attached to each of these rear contact plates, extend flexible wire leads, which are led through porcelain bushings in the bottom of the case, and are connected to that portion of the line which the

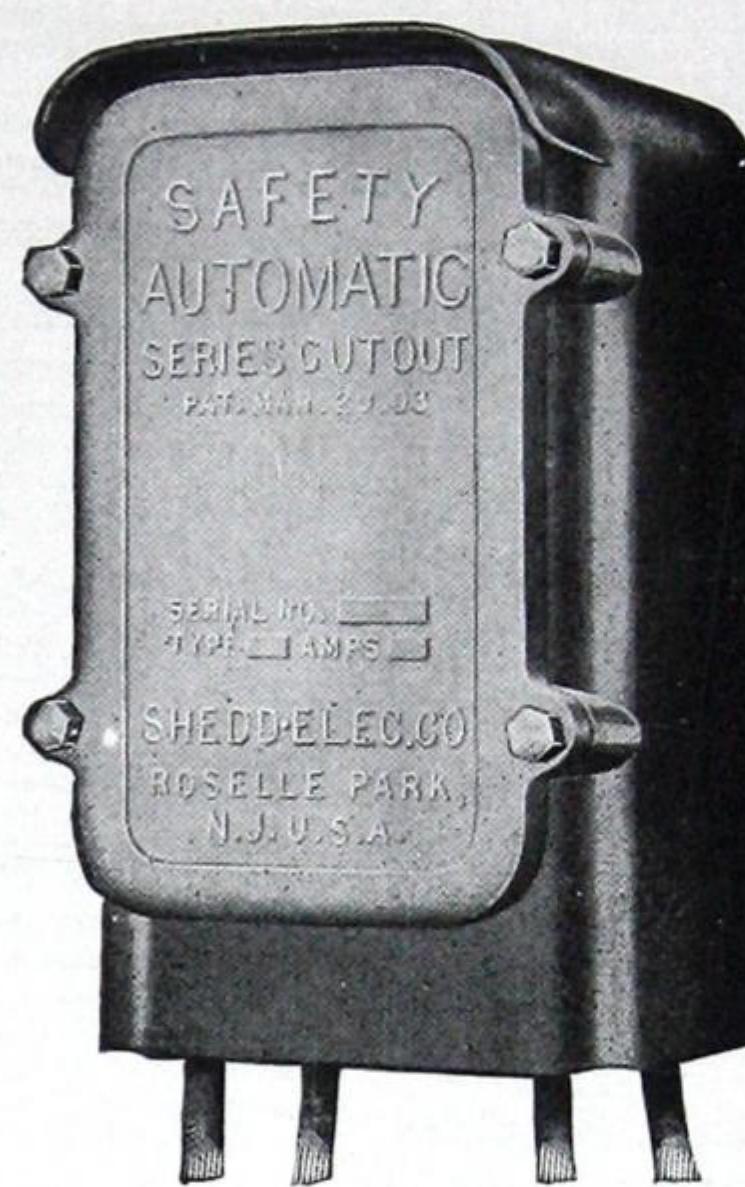


FIG. 1—SAFETY AUTOMATIC SERIES CUTOUT, COMPLETE

cutout is protecting. Mounted upon the front of the large porcelain insulators, and well insulated from the rear flat contacts, are two supports, so constructed as to hold the carbons in such a position as to form an adjustable spark gap. From below the rings, which form part of the supports, extend flexible leads, which are led through porcelain bushings in the bottom of the case, and connected to the line.

### OPERATION

**Circuit**—In Fig. 3, the circuit, under normal conditions, starts from the terminal  $T$  of a constant-current dynamo or constant-current transformer, passes through the series lamps  $L, L$ , etc., along the flexible conductor  $J$ , to the laminated contact  $B$  and contact plate  $C$ , through the lamps  $N, N$ , etc., to contact plate  $C^1$  and laminated contact  $B^1$ , along flexible conductor  $J^1$ , through balance of lamps  $L, L$ , etc., to terminal  $T^1$  of the dynamo or transformer.

**Protected Section**—The section of the above circuit which is being protected by the Safety Automatic Series Cutout, extends from contact plate  $C$ , through lamps  $N, N$ , etc., to contact plate  $C^1$ .

**When break occurs** in the circuit protected by the cutout, say at  $O$ , immediately the full potential difference of the line will exist across the adjustable gap  $G$  between the carbons  $E$  and  $E^1$ , the carbons being so adjusted that this potential difference will be sufficient to break down the air-gap. For an instant the circuit flows from  $T$  through lamps  $L, L$ , etc., to carbon  $E$ , across gap  $G$  to carbon  $E^1$ , through solenoid coil  $S$  to  $R$ , through lamps  $L, L$ , etc., to terminal  $T^1$ . This condition exists but for a moment, as the current immediately energizes the solenoid  $S$ , causing core  $A$  to be drawn up, carrying with it the porcelain insulator  $P$  and contacts  $B$  and  $B^1$ , thus opening the circuit containing the lamps  $N, N$ , etc., at  $C$  and  $C^1$ . At the same time the

## SHEDD SAFETY AUTOMATIC SERIES CUTOUT—(DS784)—Continued

contact *B* makes contact with *D*, thus short-circuiting the gap *G*.

**No Energy Consumed**—The apparatus consumes absolutely no energy, except when trouble exists in the part of the circuit containing the lamps *N*, *N*, etc., and then consumes only a small amount of energy. The contacts do not make or break any current when the cutout operates.

**Exceptional Cases**—In case an open circuit occurs in the protected loop during the day, and remains open, the loop will automatically be disconnected by the cutout as soon as the circuit is started. If an open circuit occurs just before the lights are extinguished, the cutout will automatically reconnect the defective loop as soon as the circuit is shut down. When the usual day test is made, the trouble will appear. If for any reason the trouble on the line has not been noticed, or remains unrepaired upon starting the circuit at night the cutout will act, and immediately disconnect the defective portion.

**Reliability**—As the cutout is built to work under the most trying conditions, and in view of the fact that it must never fail in its operation, only the best of material and workmanship is employed in its construction. Each device is thoroughly tested for insulation, heating effect, and operation, all with reference to the line upon which it is to be placed, and a safety factor of from 200 to 300 per cent is allowed.

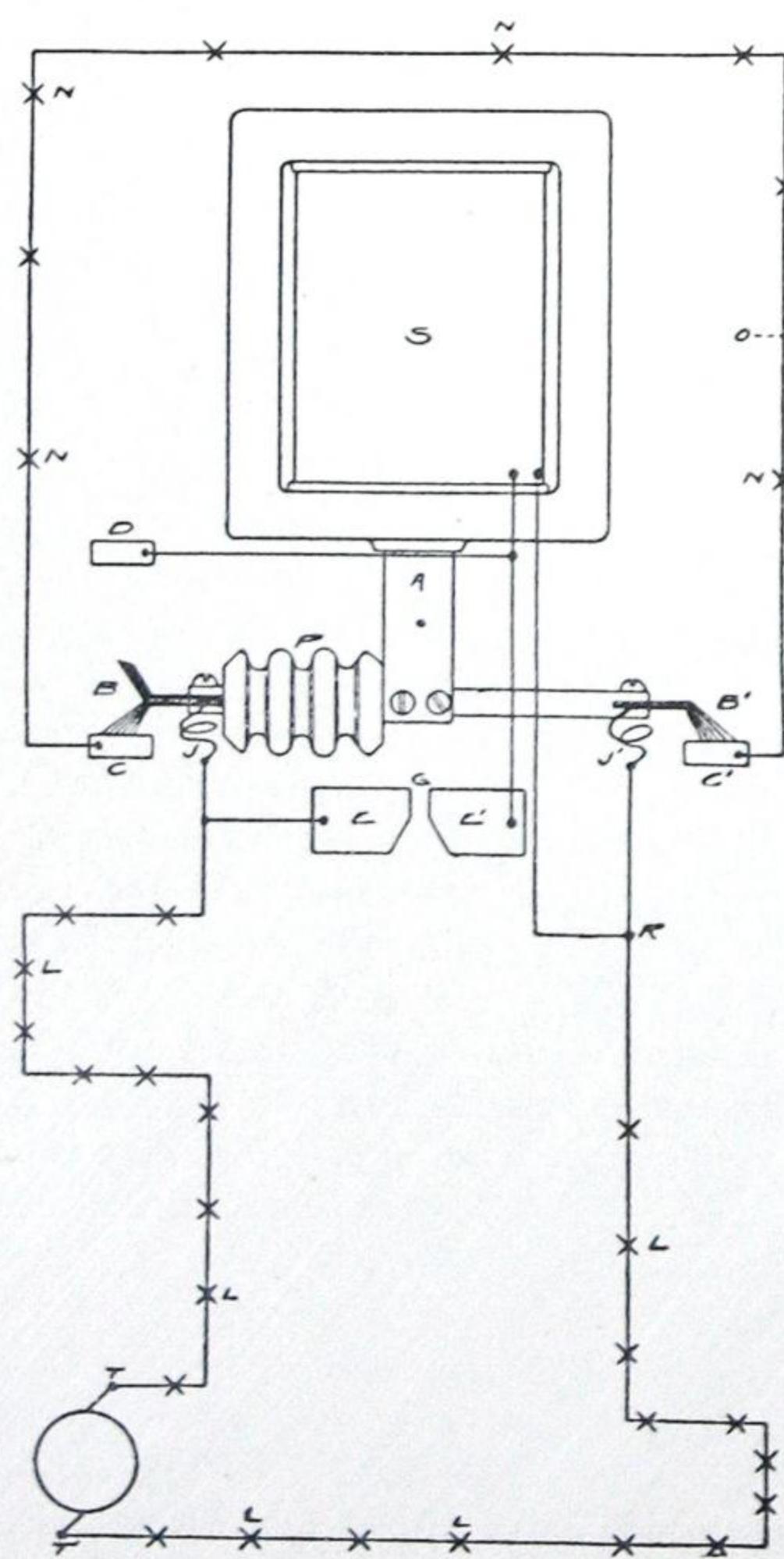


FIG. 3—DIAGRAM OF CIRCUITS

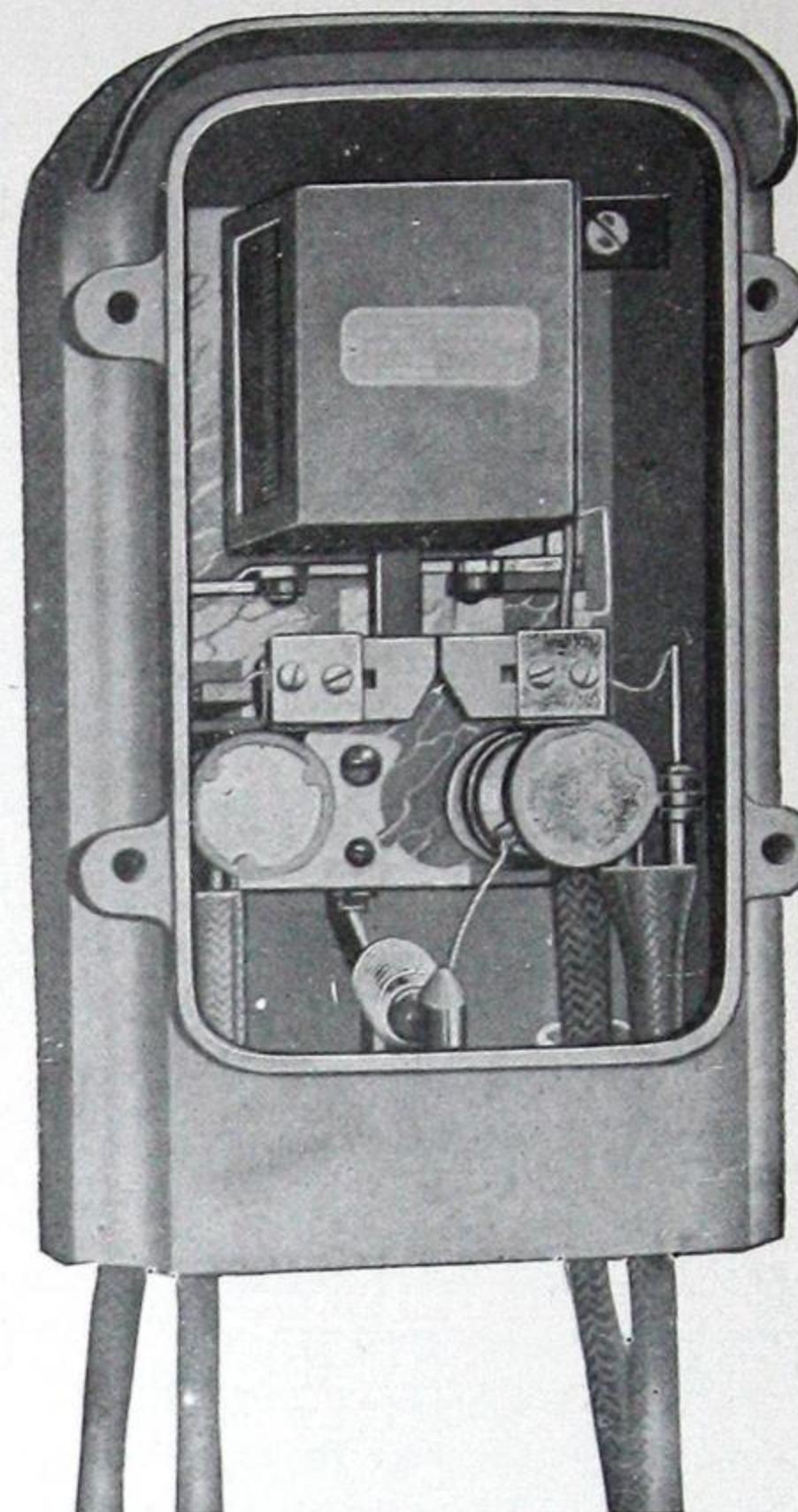


FIG. 2—CUTOUT WITH COVER REMOVED

To reset the cutout the circuit is opened for an instant at the station. This allows the solenoid core to drop and when the circuit is restored the part that has been repaired becomes operative. If, however, there is another undiscovered break the cutout will again operate.

## APPLICATIONS

Fig. 4 shows one of the simplest applications of the cutout, which being placed at *A*, protects the loop beyond it. If a break occurs as at *O*, the cutout will operate, disconnecting this loop entirely from the balance of the circuit, and short-circuiting the line at *A*, keeping the remainder of the circuit in operation. The defective loop now being dead, can be repaired and re-connected into the circuit as described in the discussion of Fig. 3.

Fig. 5 represents the condition which usually exists in the lighting of a long avenue or boulevard where the two legs of the circuit run parallel without loops. *B*, *C*, and *D* are cutouts placed in multiple across the line. Suppose a break occurs beyond *B*; *B* will operate, disconnecting the defective portion while maintaining the entire line up to *B*. If the break occurs between *C* and *B*, *C* would operate cutting off everything beyond *C*, and maintaining the circuit up to *C*; in the same manner if the break occurs between *C* and *D*, *D* would operate. In order to obtain this action, it is only necessary to adjust the spark gap of each cutout so that the gap increases in length as the cutouts approach the station. It is then evident that when a break occurs, say beyond *B*, the full line potential difference will momentarily exist across the three spark

## SHEDD SAFETY AUTOMATIC SERIES CUTOUT—(DS784)—Continued

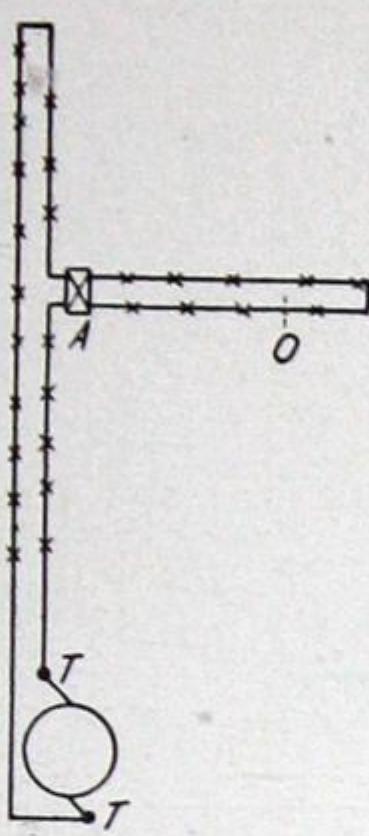


FIG. 4

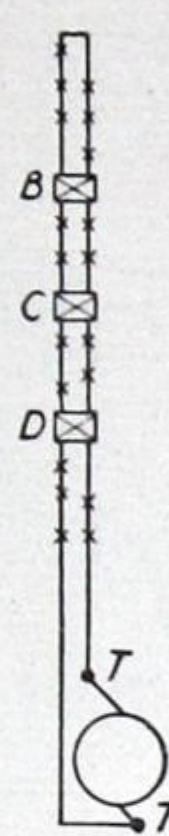


FIG. 5

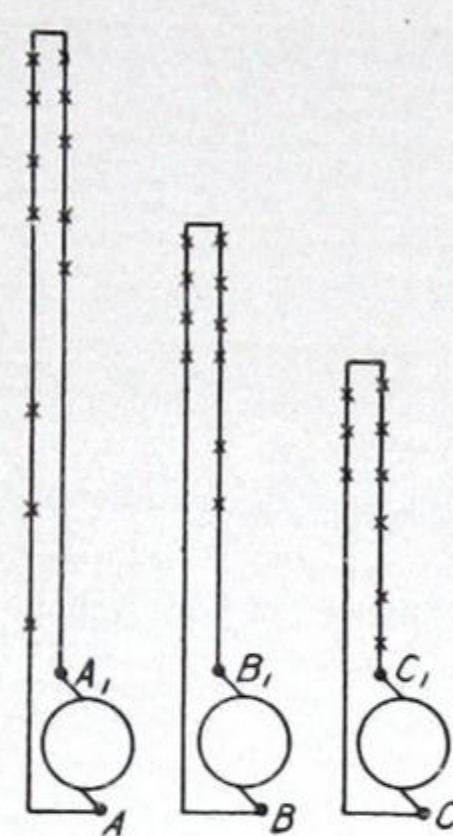


FIG. 6

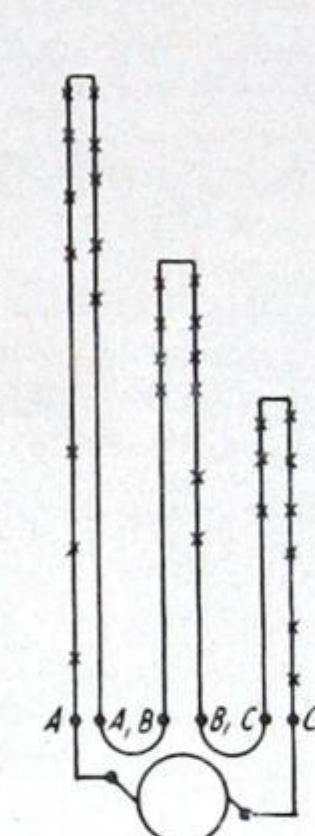


FIG. 7

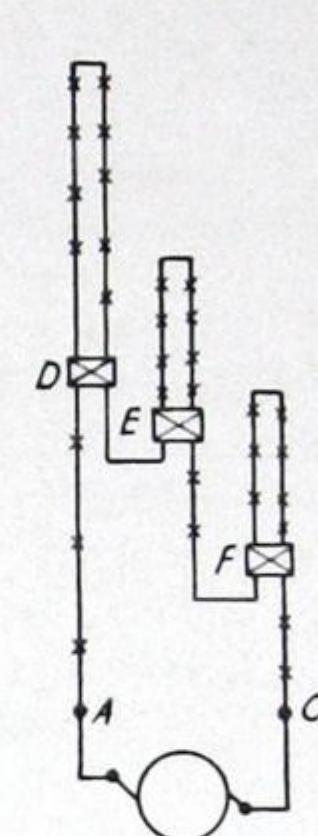


FIG. 8

gaps; but, spark gap *B* being the shortest, will be broken down first, thus operating the cutout *B*. In the same manner should the break occur between *B* and *C*, *C* will operate. In this manner all parts of the circuit up to the cutout nearest the trouble will always be maintained.

The adjustment of the spark gaps is not a delicate or difficult operation, it being only necessary to see that the gaps have an increasing length as they approach the station when cutouts are placed in parallel along the line. Where a cutout protects a loop, as in Fig. 4, the gap may be any length, provided it is not so great that the full line potential difference will not break it down, or so short that the potential difference normally existing at the point *A*, Fig. 4, is sufficient to break it down.

Fig. 6 shows three circuits as ordinarily operated from three individual dynamos or transformers. Fig. 7 represents the same three circuits being operated from a single machine or transformer of large capacity, in which case it is the usual practice to keep the terminals of these various circuits in the station as *A A'*, *B B'*, and *C C'*, so that, should trouble occur on any one of the lines, the defective line can be disconnected and the other two circuits kept in service, thus locating the trouble on one-third of the line and preventing the entire system from being out of service. This is frequently done at the expense of long lengths of wire, which could be dispensed with were it not for this desire to localize the trouble. By introducing cutouts on the system the same results may be obtained and the unnecessary wire removed, this being illustrated by Fig. 8,

which shows the same three circuits equipped with cutouts *D*, *E* and *F*, which allow the removal of the portion of the lines *A'*, *B*, *B'*, and *C* from their station terminals to the points as shown, leaving at the station only the terminals *A* and *C'*. This results in a considerable saving in wire with its necessary line loss, station apparatus, maintenance, the eliminating of possible trouble on the portion of the line removed, the making of room on the poles for other wires, and at the same time having better protection than when these lines were running to the station, plus the protection afforded by other cutouts which might be placed upon the system.

While the above is a brief outline of a few of the possibilities of the cutout as applied to simple cases, its application to any individual case will readily suggest itself to the up-to-date lighting man.

## TESTS

All cutouts are thoroughly tested for the particular circuit for which they are designed, are carefully inspected and packed, and leave the factory in perfect working condition.

## ORDERING

In ordering cutouts specify the maximum voltage of the circuits on which they are to operate, to enable proper tests to be made, also the current, as the coils have to be wound accordingly. Cutouts for 3.5 to 9.6 amperes are carried in stock.

Maximum  
Voltage  
10,000

Approx. Shipping  
Weight—Lbs.  
115

List  
Price  
On application

## BENJAMIN FIXTURES FOR MAZDA MULTIPLE LAMPS\*—(DS702)

Prices in this section are effective Oct. 20, 1915

National Electrical Code Standard

Schedule II C Discounts apply to material listed on this page

### WITH CHAIN SUSPENSIONS

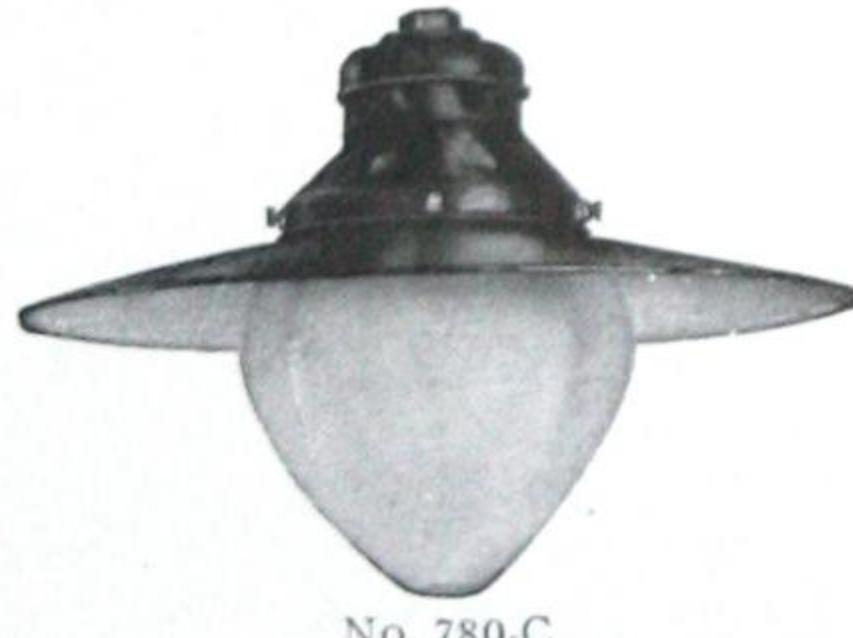
**Fixtures Nos. 761C-764C** have Benco socket, ventilated holder as listed, chain suspension extending 14 inches from socket to top of canopy, 5-inch by 4-inch canopy, and crowfoot. Extra length chains list at 50c per foot. Stalactite globes of sizes indicated, with bottom opening, furnished regularly, but ball globes in corresponding sizes can be supplied without change in price. Chain loops are drilled to take No. 14 asbestos-covered wire. Standard finish is brushed brass. Canopy and chain may be omitted at a reduction of \$1.10 from list.



No. 762-C

Mfrs. No.	Length of Fixture Inches	Size of Globe Inches	Size of Lamps, Watts	LIST PRICE	Complete
761C	23	6 x 4	25, 40, 60	\$0 70	\$2 80
762C	24	7 x 5	100, 200	80	3 10
763C	26	8 x 6	200	90	3 40
764C Mogul	27	8 x 6	300, 400, 500	90	4 00

### FOR PIPE SUSPENSIONS



No. 780-C

**Fixtures Nos. 780C-787C** include ventilated hoods and holders of material as listed, stalactite globe of correct density, and two-piece easy-to-wire porcelain socket with **Benjamin Lamp Grip**. Flange is securely attached to hood so that support of fixture does not depend on socket. 100-200-watt fixtures have one-piece hood, while 300-500-watt fixtures have two-piece hood to provide for greater ventila-

tion. Fittings are regularly supplied for  $\frac{1}{2}$ -inch pipe;  $\frac{3}{8}$ -inch may be ordered without change in price, or  $\frac{3}{4}$ -inch at an advance of 10c list.

**Ventilation—Globes** are regularly furnished with hole in bottom, in line with general practice, although globe ventilation is rarely necessary on account of the adequate provision made in Benjamin fixture hoods. Globes without hole will be furnished when specified, without change in price. Globes list as follows: 7 inches by 5 inches, 70c; 8 inches by 6 inches, 90c. Spherical globes of same dimensions may be ordered without advance in price. "Trutint" 8-inch by 6-inch stalactite globes, giving noonday sunlight effect, will be furnished with 300-500-watt fixtures at an advance of \$1.50 list. For 18-inch reflector with Nos. 784C-787C, add 50c list. Reflectors are flat cone black enameled, and may be omitted at a reduction from list price of \$1.00 for 12-inch and \$1.50 for 15-inch.

Mfrs. No.	Kind of Hood	Finish	Size of Refl. In.	Size of Globe, In.	Size of Lamps, Watts	List Price
780C	Copper	Natural	12	7 x 5	100, 200	\$3 30
781C	Copper	Black Enamel	12	7 x 5	100, 200	3 40
783C	Steel	Black Enamel	12	7 x 5	100, 200	2 80
784C	Copper	Natural	15	8 x 6	300, 400, 500	4 70
785C	Copper	Black Enamel	15	8 x 6	300, 400, 500	4 80
787C	Steel	Black Enamel	15	8 x 6	300, 400, 500	3 80

Prices are less wires and lamps.

\*For modifications of fixtures shown herein and complete line see Benjamin catalogue B-21 dated September, 1915.

## BENJAMIN FIXTURES FOR MAZDA MULTIPLE LAMPS—(DS702)—Continued

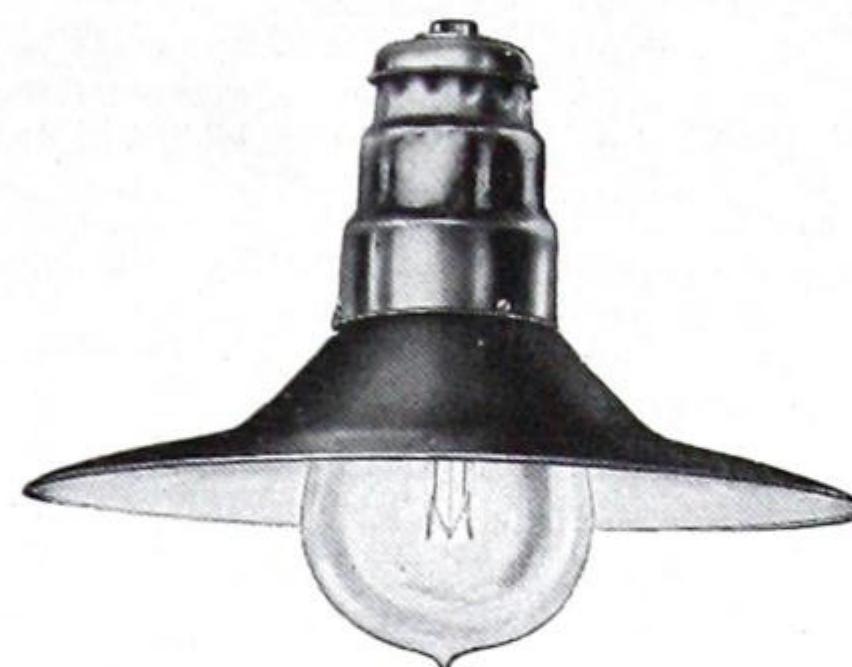
Schedule II Discounts apply to all materials listed on this page

## WITH SHALLOW BOWL REFLECTORS



No. 6129

## WITH FLAT-CONE REFLECTORS



No. 6109

**Fixtures Nos. 6126-6135** have shallow-bowl enameled-steel reflector, ventilated hood and two-piece easy-to-wire porcelain socket with **Benjamin Lamp Grip**. The reflector is easily removed to facilitate wiring. Fittings tapped  $\frac{1}{2}$  inch.

For fixture with  $\frac{1}{2}$ -inch suspension fitting No. 6031M, add 65c list; with fitting No. 6049M, add 80c list. Standard finish is black enamel.

Mfrs. No.	Description	Size of Reflector, Inches	Size of Lamps, Watts	List Price
6134	Copper Hood	16	200	\$5 00
6135	Steel Hood	16	200	4 40
6126	Copper Hood	18	300, 400, 500	5 90
6127	Steel Hood	18	300, 400, 500	5 20
6128	Copper Hood	20	750, 1000	8 25
6129	Steel Hood	20	750, 1000	7 10

Mfrs. No.	Description	Size of Reflector, Inches	Size of Lamps, Watts	List Price
6144	Copper Hood	16	200	\$5 00
6145	Steel Hood	16	200	4 40
6146	Copper Hood	18	300, 400, 500	5 70
6148	Steel Hood	18	300, 400, 500	5 00
6108	Copper Hood	20	750, 1000	6 90
6109	Steel Hood	20	750, 1000	5 70

## WITH DEEP BOWL REFLECTORS



No. 6274



No. 6031-M      No. 6049-M

**Fixtures Nos. 6265-6274** have deep-bowl enameled steel reflector with ventilated hood as indicated, and two-piece easy-to-wire porcelain socket with **Benjamin Lamp Grip**. Hoods are tapped  $\frac{1}{2}$  inch, but  $\frac{3}{4}$  inch may be ordered at an advance of 10c

list; 1 inch or  $1\frac{1}{4}$  inch, at an advance of 15c list. Reflector is easily removed to facilitate wiring. For fixture with suspension fitting 6031M, add 65c list; for 6049M, add 80c list. Standard finish is black enamel.

Mfrs. No.	Description	Size of Reflectors, Inches	Size of Lamps, Watts	List Price
6265	Copper Hood	12	200	\$4 30
6266	Steel Hood	12	200	3 80
6267	Copper Hood	12	300, 400, 500	4 80
6268	Steel Hood	12	300, 400, 500	4 00
6273	Copper Hood	15	750, 1000	6 70
6274	Steel Hood	15	750, 1000	5 60

Prices are less wires and lamps.

## EFFICIENT AND ARTISTIC LIGHTING WITH CUTTER STREETHOODS AND BRACKETS

### TYPE C LAMPS

The development of the Type C lamps and the design of reflector equipment for their proper application to specific lighting requirements, have made it possible to obtain high efficiency and pleasing effects under almost every conceivable condition. The shape of the filaments of these new lamps permits of greater accuracy in light distribution than formerly obtained. Their operating characteristics, however, in the large sizes, have presented new problems necessitating ventilation and elimination of glare. These have been solved so successfully that it is possible to secure light of any desired intensity and so distributed over a given area, that a well lighted street is now easily realized and at a low cost.

### CUTTER REFLECTORS

As no single unit or lamp has been found applicable to all lighting requirements, we have designed a complete line of reflectors in several shapes and sizes to accommodate different sizes of lamps and to accomplish varied results. Characteristic curves for each style of reflector as shown on the following pages, will assist the illuminating engineer in selecting proper equipment for any particular installation.

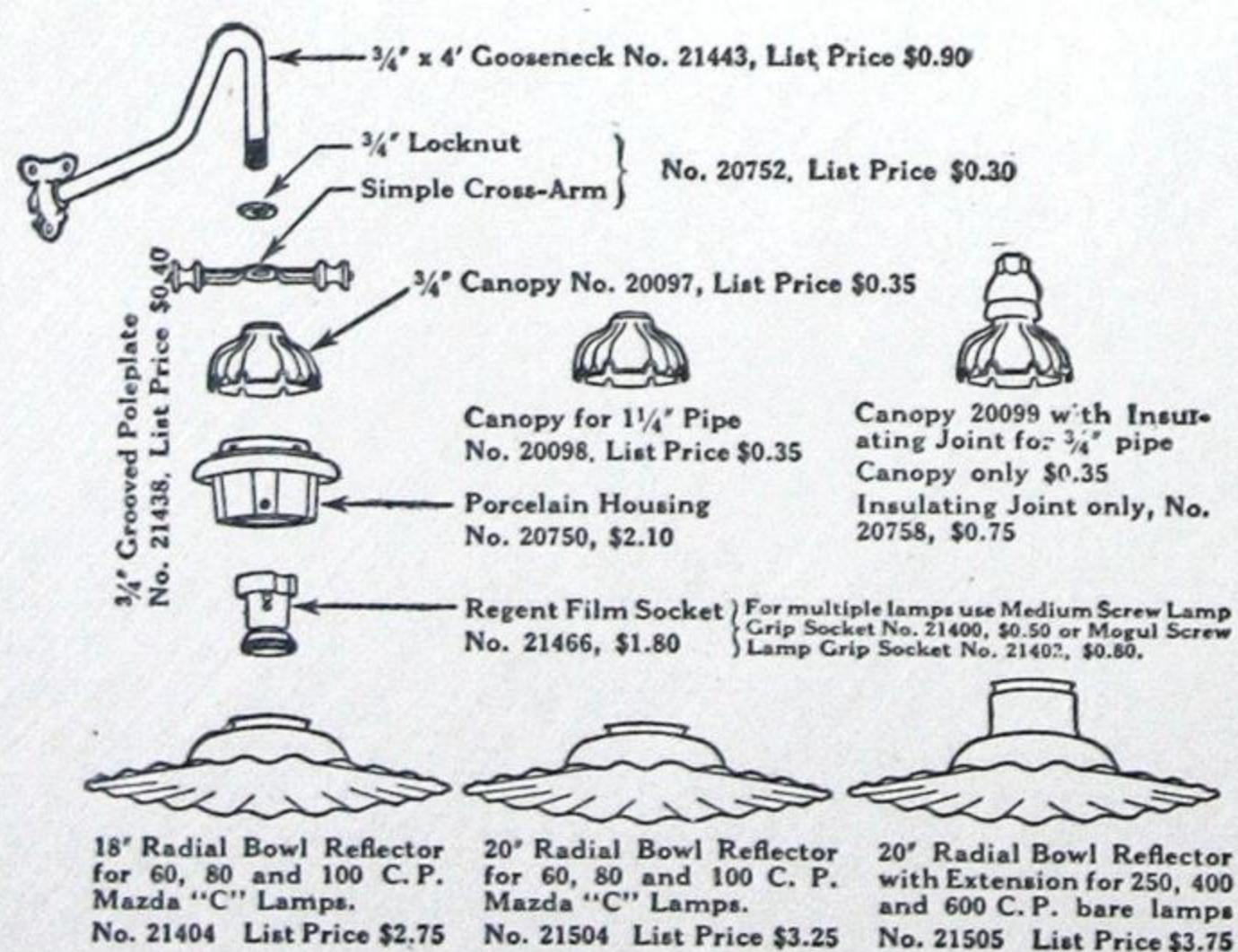
The size of lamp is given for each style and size of reflector. Where several reflectors are recommended for a lamp of given candle power rating, one should be guided by the distribution curves. Expert engineering advice will be given upon request.

### EFFICIENCY AND DISTRIBUTION

While lamp efficiency is a very important consideration in street lighting, proper distribution of the light is even more important in affording useful illumination. Therefore, the value of a reflector is determined principally by the way in which the light is distributed over a given area. With the Radial Bowl and Inverted Cone Reflectors, the maximum amount of light is directed into planes where it is most needed to obtain uniform illumination. Enough light passes above the horizontal plane of the lamp to show the outlines of building fronts.

### SPACING AND MOUNTING HEIGHTS

Local conditions govern spacing and mounting heights. Where there are shade trees, the fixtures should be hung low enough for the light to clear the foliage, otherwise they should be placed well above the ground. The size of lamp and style of reflector determine the actual heights as follows: 15 to 18 feet for Radial Bowl Reflectors with 100 candle power and smaller lamps; 20 to 25 feet with 250 candle power and larger lamps; 12 to 15 feet for Flat Radial Wave Reflectors; 10 to 15 feet for 18-inch Inverted Cone Reflectors, and 12 to 20 feet for 22-inch Inverted Cone Reflectors.



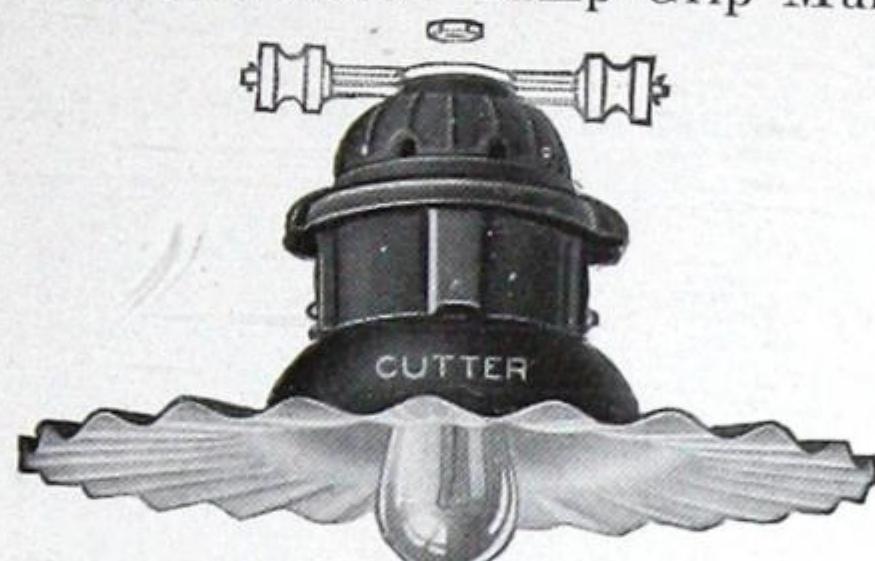
### CUTTER BRACKETS

Reflectors with suspension parts are listed in this catalogue as streethood bodies. Interchangeable parts make it easy to convert from one style to another. Brackets for supporting the streethood bodies are listed separately. These are made in plain and ornamental types and of such a variety of designs that it is possible to select a complete fixture to meet any requirement for efficient and for artistic lighting.

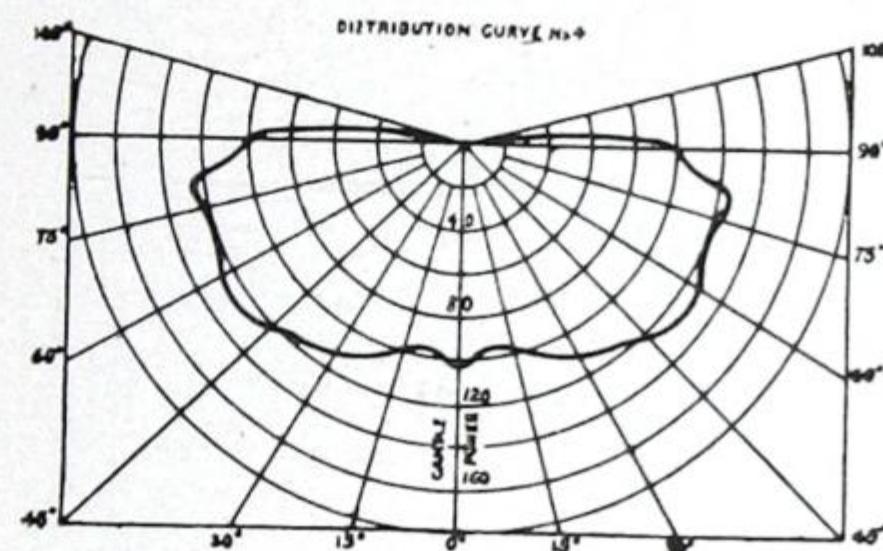
## CUTTER STREETHOOD BODIES

For 60, 80 and 100 C. P. Series and Small Multiple Mazda Lamps  
Schedule A—Standard Package Quantity, 20 of one Style or Trade Number

A Streethood Body consists of a ventilated iron canopy threaded for  $\frac{3}{4}$ -inch pipe or adapter or for  $1\frac{1}{4}$ -inch pipe; a porcelain housing with attachments for either multiple or series sockets and a porcelain enameled Reflector with 4-inch copper heel and with or without diffusing glassware. The porcelain housing is made for use with either inner-wired or outer-wired fixtures and is covered with a weatherproof glaze. Wires leading to the socket may be tied securely in the rim of the porcelain, thus eliminating the necessity of a cross-arm.† Where list prices include sockets, Cutter Lamp Grip Multiple Sockets or Regent Film Sockets\* will be supplied. Concentric reflectors are recommended only for use with refractors and diffusers.



18-inch Radial Bowl Streethood Body,  
Showing use of Simple Cross-Arm  
and Locknut for  
 $\frac{3}{4}$ -inch Gooseneck Suspension



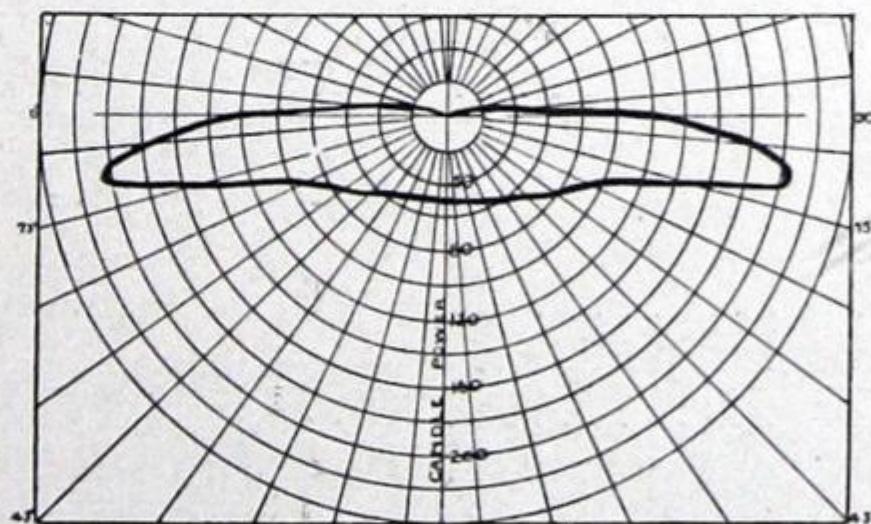
Distribution Curve for 100 C. P.  
Lamp and 18-inch Radial Bowl  
Reflector



20-inch Flat Radial  
Streethood Body



18-inch Concentric Dome Body with  
Small Refractor



Distribution Curve for 100 C. P.  
Series Lamp and 18-inch Concentric  
Dome Reflector with Refractor

### 18-INCH RADIAL BOWL STREETHOOD BODIES

For 60, 80 and 100 C. P. Series and 200-watt or Smaller  
Multiple Type C Mazda Lamps

Trade Number For $\frac{3}{4}$ - In. Pipe	For $1\frac{1}{4}$ - In. Pipe	Description	Ship. Wt. Lbs.	Price Each
20001	20002	Medium Screw Socket.	$13\frac{5}{8}$	\$5.70
20003	20004	Mogul Screw Socket..	14	6.00
20005	20006	*Regent Film Socket...	$14\frac{1}{4}$	7.00
20007	20008	Without Socket.....	$12\frac{3}{4}$	5.20

### 20-INCH RADIAL BOWL STREETHOOD BODIES

For 60, 80 and 100 C. P. Series and 200-watt or Smaller  
Multiple Type C Mazda Lamps

20009	20010	Medium Screw Socket.	$14\frac{7}{8}$	6.20
20011	20012	Mogul Screw Socket..	$15\frac{1}{4}$	6.50
20013	20014	*Regent Film Socket...	$15\frac{1}{2}$	7.50
20015	20016	Without Socket.....	14	5.70

### 20-INCH FLAT RADIAL STREETHOOD BODIES For Old Style Series and Small Multiple Lamps

20033	20034	Medium Screw Socket	$12\frac{1}{8}$	4.95
20035	20036	Mogul Screw Socket	$12\frac{1}{2}$	5.25
20037	20038	*Regent Film Socket	$12\frac{3}{4}$	6.25
20039	20040	Without socket	$11\frac{7}{8}$	4.45

### 18-INCH CONCENTRIC DOME BODIES WITH SMALL HOLOPHANE REFRACTOR

For 60, 80 and 100 C. P. Type C Series Mazda Lamps

22177	22178	Medium Screw Socket	$16\frac{5}{8}$	8.95
22179	22180	Mogul Screw Socket	17	9.25
22181	22182	*Regent Film Socket	$17\frac{1}{4}$	10.25
22183	22184	Without socket	$15\frac{3}{4}$	8.45

### 18-INCH CONCENTRIC DOME BODIES WITH SMALL OPAL DIFFUSER

For 60, 80 and 100 C. P. Type C Series Mazda Lamps

22185	22186	Medium Screw Socket	$14\frac{5}{8}$	6.45
22187	22188	Mogul Screw Socket	15	6.75
22189	22190	*Regent Film Socket	$15\frac{1}{4}$	7.75
22191	22192	Without socket	$13\frac{3}{4}$	5.95

### PARTS FOR STREETHOOD BODIES

20097	20098	Canopy only	$1\frac{3}{4}$	.35
20099		Canopy only for insulating point on Style B Bracket.....	$1\frac{3}{4}$	.35
20750		Porcelain housing.....	$6\frac{1}{4}$	2.10
21404		18-inch radial bowl reflector.....	$4\frac{3}{4}$	2.75
21504		20-inch radial bowl reflector.....	6	3.25
21507		20-inch flat radial reflector.....	$3\frac{7}{8}$	2.00
22196		18-inch concentric dome reflector with holder.....	$4\frac{1}{4}$	3.25
22197		Small Holophane refractor.....	$3\frac{1}{2}$	3.25
22198		Small opal diffuser.....	$1\frac{1}{2}$	.75

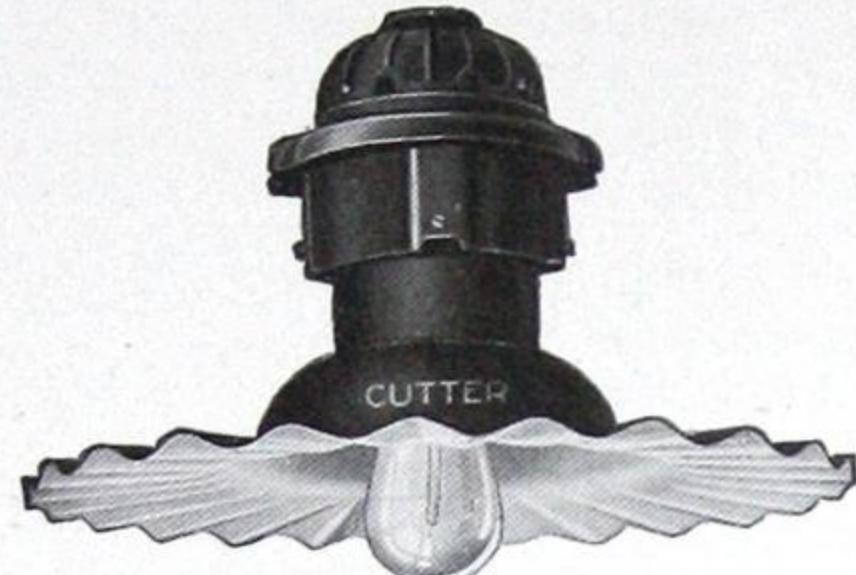
†Simple cross-arm No. 20752 with  $\frac{3}{4}$ -inch locknut may be attached to canopy for  $\frac{3}{4}$ -inch gooseneck suspension. Add 30 cents to list price.

\*Standard Film Socket shown on another page will be furnished in place of Regent when so ordered.

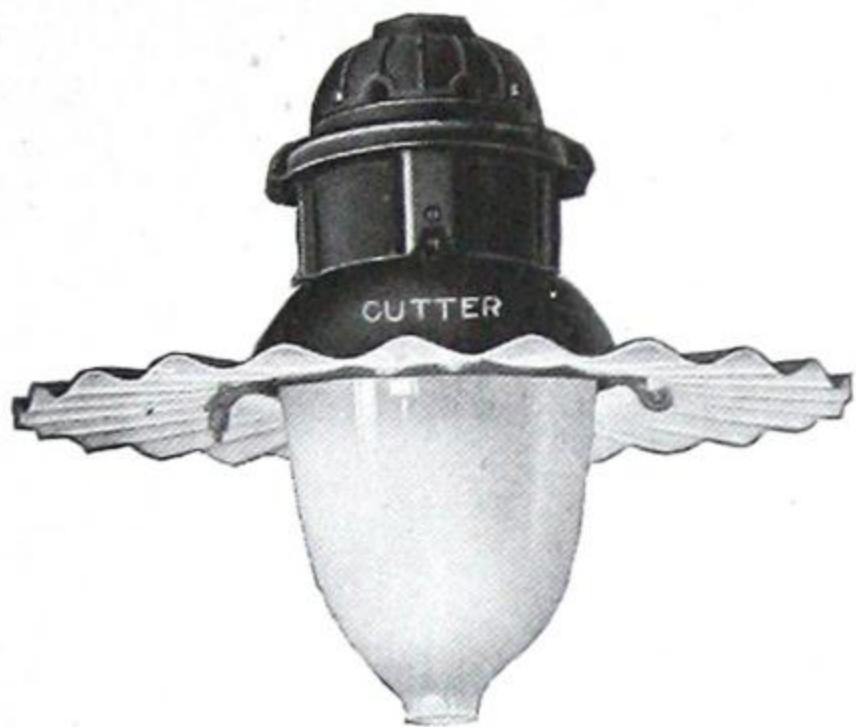
## CUTTER STREETHOOD BODIES

## RADIAL AND CONCENTRIC

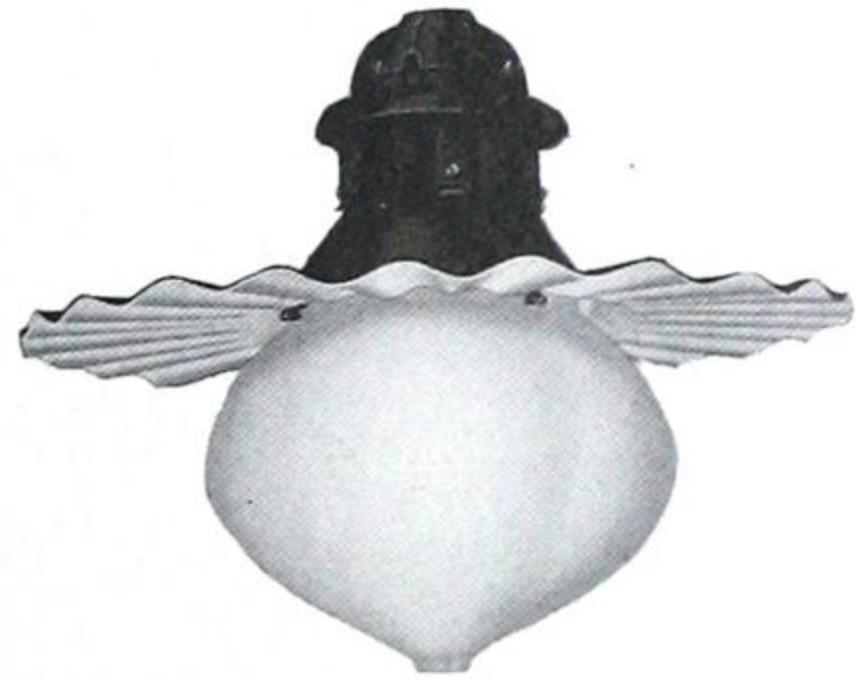
For 250, 400 and 600 C. P. Series and Large Multiple Type C Mazda Lamps  
Schedule A—Standard Package Quantity, 20 of one Style or Trade Number



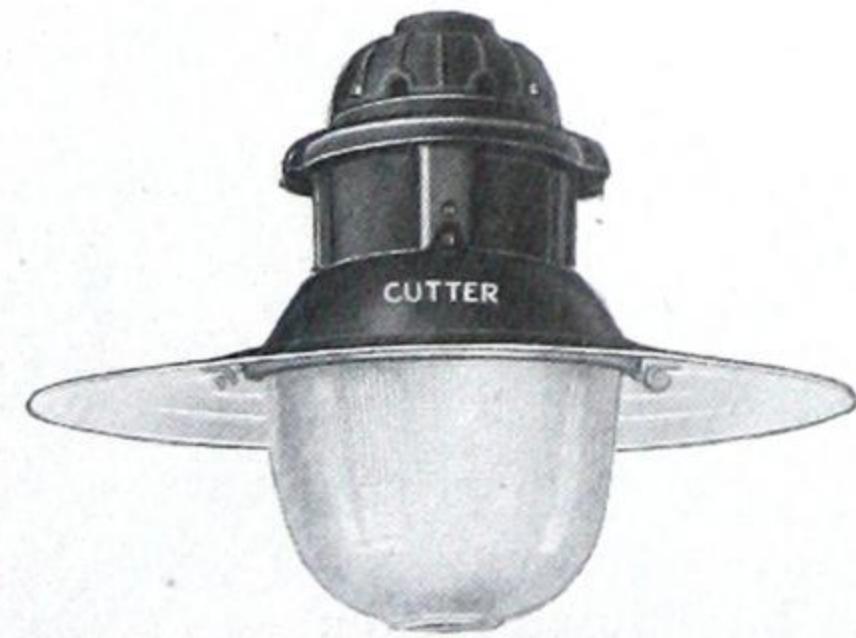
20-inch Radial Bowl Streethood Body, with Extension



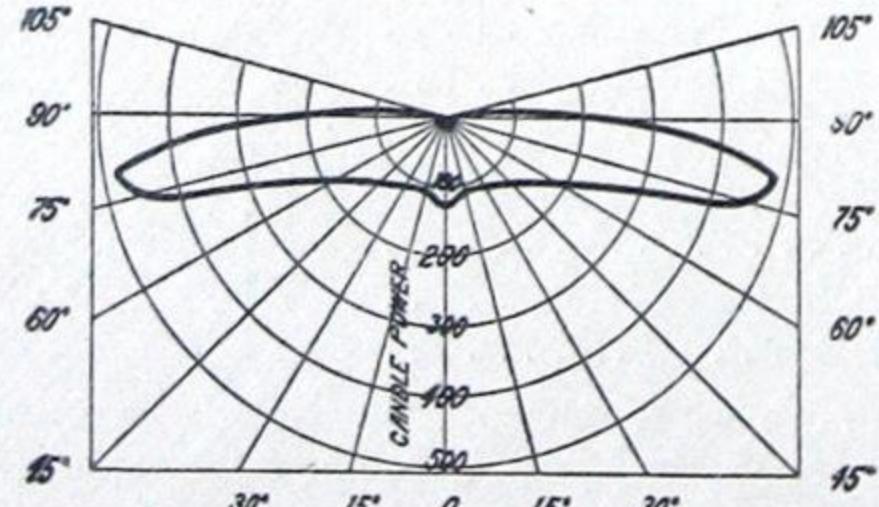
18-inch Radial Bowl Streethood Body with Large Sol-Lux Diffuser



24-inch Radial Bowl Streethood Body with Acorn Diffuser



20-inch Concentric Dome Streethood Body with Large Refractor



Distribution Curve for 250 C. P. Lamp and 18-inch Radial Bowl Reflector with Large Refractor

Streethood Bodies listed on this page are similar to those listed on the previous page, but the reflectors are designed for larger lamps. The 20-inch Radial Bowl Reflector with extension is used without refractor or diffuser. Other reflectors shown on this page are equipped with hinged holders and are listed with large Holophane Refractor or Sol-Lux Diffuser. Where list prices include sockets, Cutter Lamp Grip Multiple Sockets or Regent Film Series Sockets will be supplied.\*

## 20-INCH RADIAL BOWL STREETHOOD BODIES WITH EXTENSION

For 250, 400 and 600 C. P. Series and 300-Watt or Larger Multiple Type C Mazda Lamps

Trade No. For 3/4-in. Pipe	1 1/4-in. Pipe	Description	Ship Wt. Lbs. Each	Price Each
20017	20018	Medium Screw Socket	15 7/8	\$6.70
20019	20020	Mogul Screw Socket...	16 1/4	7.00
20021	20022	*Regent Film Socket...	16 1/2	8.00
20023	20024	Without socket.....	15	6.20

## 18-INCH RADIAL BOWL BODIES WITH LARGE HOLOPHANE REFRACTOR

For 250, 400 and 600 C. P. Type C Series Mazda Lamps

20049	20050	Medium Screw Socket	21 1/2	13.95
20051	20052	Mogul Screw Socket...	21 3/4	14.25
20053	20054	*Regent Film Socket...	22	15.25
20055	20056	Without socket.....	21	13.45

## 18-INCH RADIAL BOWL BODIES WITH LARGE SOL-LUX DIFFUSER

For 250, 400 and 600 C. P. Type C Series Mazda Lamps

22199	22200	Medium Screw Socket	17 1/2	8.45
22201	22202	Mogul Screw Socket...	17 3/4	8.75
22203	22204	*Regent Film Socket...	18	9.75
22205	22206	Without socket.....	17	7.95

## 24-INCH RADIAL BOWL STREETHOOD BODIES WITH ACORN DIFFUSER

For 250, 400 and 600 C. P. Series and 400, 500, 750 and 1000-Watt Multiple Type C Mazda Lamps

20025	20026	Medium Screw Socket	26 7/8	11.20
20027	20028	Mogul Screw Socket...	27 1/4	11.50
20029	20030	*Regent Film Socket...	27 1/2	12.50
20031	20032	Without socket.....	26	10.70

If Acorn Diffuser is not wanted, deduct \$3.75 list.

## 20-INCH CONCENTRIC DOME BODIES WITH LARGE HOLOPHANE REFRACTOR

For 250, 400 and 600 C. P. Type C Series Mazda Lamps

22207	22208	Medium Screw Socket	21 5/8	13.70
22209	22210	Mogul Screw Socket...	22	13.95
22211	22212	*Regent Film Socket...	22 1/4	15.00
22213	22214	Without socket.....	20 3/4	13.20

## 20-INCH CONCENTRIC DOME BODIES WITH LARGE SOL-LUX DIFFUSER

For 250, 400 and 600 C. P. Type C Series Mazda Lamps

22215	22216	Medium Screw Socket	17 5/8	8.20
22217	22218	Mogul Screw Socket...	18	8.50
22219	22220	*Regent Film Socket...	18 1/4	9.50
22221	22222	Without socket.....	16 3/4	7.70

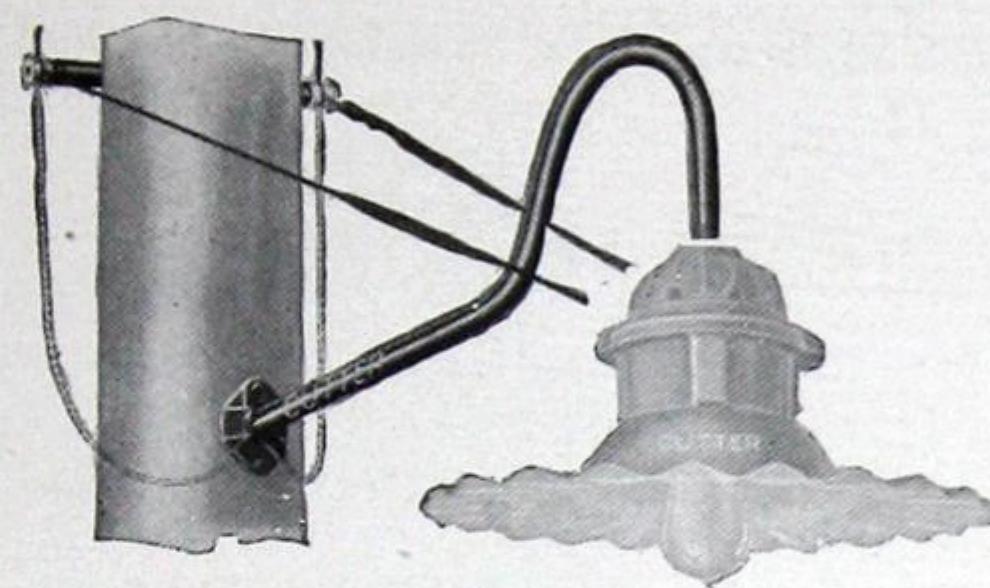
## PARTS FOR STREETHOOD BODIES

20097	20098	Canopy only.....	1 3/4	.35
20750		Porcelain housing.....	6 1/4	2.10
21502		18-inch Radial Bowl with holder.....	7 3/4	4.00
21505		20-inch Radial Bowl with extension.....	7	3.75
22225		24-inch Radial Bowl with holder.....	9	5.75
21503		20-inch Concentric Dome with holder.....	7 1/2	3.75
22223		Large Holophane Refractor.....	5 1/4	7.00
22224		Large Sol-Lux Diffuser.....	1 1/4	1.50

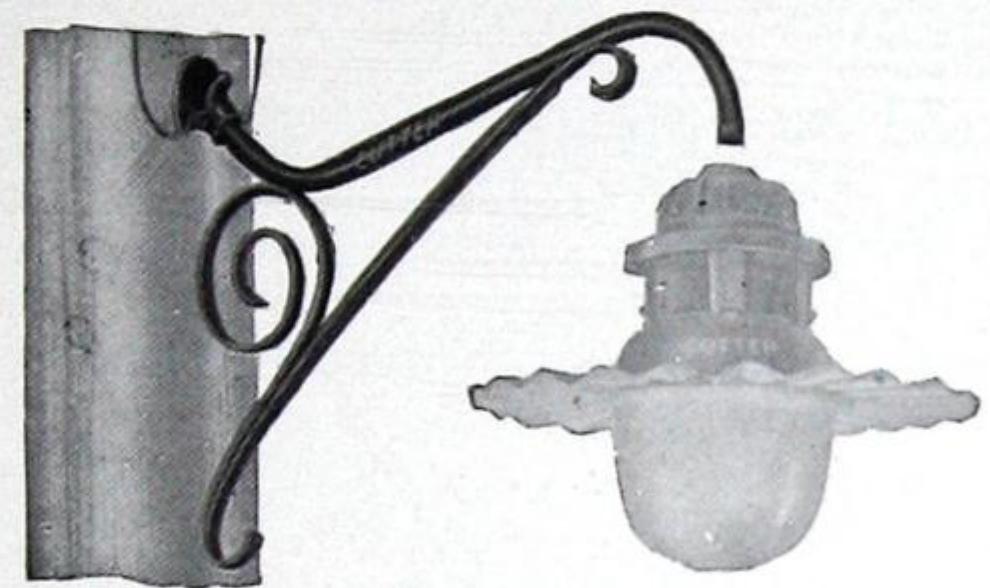
Simple cross-arm No. 20752 with 3/4-inch locknut may be attached to canopy for 3/4-inch gooseneck suspension. Add 30 cents to list price.

\* Standard film socket shown on another page will be furnished in place of Regent when so ordered.

## CUTTER INCANDESCENT BRACKETS



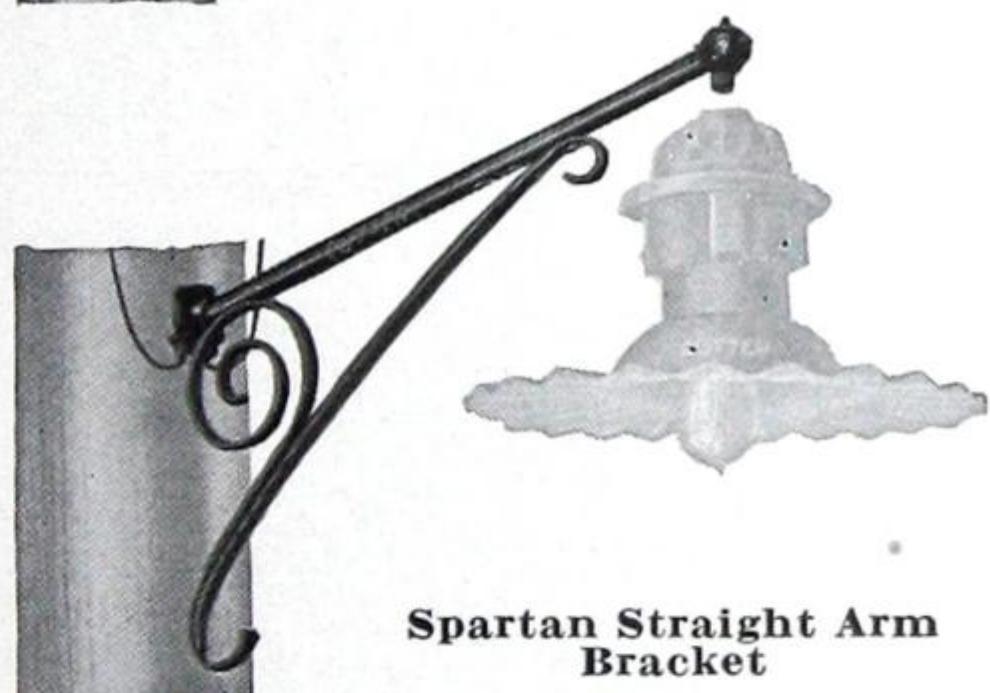
Style A Bracket



Majestic Bracket



Boulevard Telescope Bracket



Spartan Straight Arm Bracket



Arcadian Bracket



Imperial Bracket

## FOR STREETHOOD BODIES

Schedule A—Standard Package Quantity, 20 of One Style or Trade Number

Brackets listed on this page are designed for streethood bodies listed on the two preceding pages. Prices cover brackets only. The list price of a complete fixture is obtained by adding to the price of the bracket, the price of the streethood body selected.

## STYLE A BRACKETS

Style A bracket consists of 4-foot gooseneck of  $\frac{3}{4}$ -inch pipe No. 21443 and grooved pole plate No. 21438 which allows inner wiring when desired. Brace arm on back of pole guides the line wires to the streethood body, where they may be fastened in holes in the rim of the porcelain housing or to cross-arm No. 20752.

Trade No.	Description	Ship. Wt., Lbs.	Wt., Lbs.	Price Each	Price Each
21521	With Brace Arm.....	10		\$1.85	
21522	Without Brace Arm.....	7		1.30	

## STYLE B BRACKETS

Similar to Style A, with a Cutter High Voltage Insulating Joint to separate gooseneck and canopy. This insulating joint allows inner wiring. When outside wires are used, they are tied in holes in the rim of the porcelain housing. When ordering streethood bodies for Style B brackets, specify three-hole canopy No. 20099.

21523	With Brace Arm.....	13		2.60	
21524	Without Brace Arm.....	10		2.05	

## MAJESTIC BRACKETS

Made of  $1\frac{1}{4}$ -inch pipe with flat iron scroll and fancy grooved pole plate. Holds the lamp 4 feet from the pole. Scroll will be made of channel iron instead of flat iron when so ordered, at \$1.00 list additional.

21525	Bracket, Scroll and Pole Plate only.....	26		4.00	
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## BOULEVARD TELESCOPE BRACKETS

The  $\frac{3}{4}$ -inches pipe telescopes into the  $1\frac{1}{4}$ -inch pipe, allowing adjustments of 5 to 7 feet. A heavy three-hole pole plate with cross-arm and porcelain elbow makes the bracket easy to put up and wire, serving also as a protection for the wires. The knurled set screw in the pipe and the pole step in the lower corner of the scroll are for the convenience of the lineman when renewing lamps.

21526	With Pony Glass Insulators....	33		4.70	
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## SPARTAN STRAIGHT ARM BRACKETS

Consists of grooved pole plate, 4-foot arm of  $1\frac{1}{4}$ -inch pipe, fancy headpiece and artistic flat iron scroll. Channel iron scroll, \$1.00 list extra.

21527	With $\frac{3}{4}$ -inch Nipple.....	24		3.25	
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## ARCADIAN BRACKETS

A substantial 3-foot fixture made of  $1\frac{1}{4}$ -inch (bore) pipe with three-hole pole plate, insulators, porcelain elbow (to prevent abrasion of wires) wrought iron scroll and cast iron headpiece.

21528	With $1\frac{1}{4}$ -inch Nipple.....	17		3.25	
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## ARCADIAN JUNIOR BRACKETS

Similar to Arcadian, with 20-inch extension and pole plate used on Spartan Straight Arm Bracket.

21529	With $1\frac{1}{4}$ -inch Nipple.....	14		2.25	
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## IMPERIAL BRACKETS

A 4-foot arm of  $1\frac{1}{4}$ -inch pipe with a quarter bend is threaded on the outer end for supporting streethood bodies with  $1\frac{1}{4}$ -inch canopies. A channel iron scroll will be furnished in place of flat iron for \$1.00 list additional.

21530	With Grooved Pole Plate.....	20		3.00	
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## CUTTER CENTER SUSPENSION STREETHOODS

Schedule A—Standard Package Quantity, 20 of One Style or Trade Number

### STYLE D—LOOP SUSPENSION

A simple form of suspension fixture consisting of a streethood body without cross-arm, a  $\frac{3}{4} \times \frac{7}{16}$ -inch adapter and a malleable iron arc ring.

#### With 18-inch Radial Bowl Reflector

Trade No.	Description	Wt..Lbs. Each	Price Each
21531	Medium Screw Socket.....	14 $\frac{1}{4}$	\$5.95
21532	Mogul Screw Socket.....	14 $\frac{3}{4}$	6.25
21533	*Regent Film Socket.....	15	7.25

#### With 18-inch Radial Bowl and Large Refractor

21534	Medium Screw Socket.....	22 $\frac{1}{4}$	14.20
21535	Mogul Screw Socket.....	22 $\frac{3}{4}$	14.50
21536	*Regent Film Socket.....	23	15.50

#### With 18-inch Radial Bowl and Large Sol-Lux Diffuser

21515	Medium Screw Socket.....	18 $\frac{1}{4}$	8.70
21516	Mogul Screw Socket.....	18 $\frac{3}{4}$	9.00
21474	*Regent Film Socket.....	19	10.00

#### With 20-inch Radial Bowl Reflector

21540	Medium Screw Socket.....	15 $\frac{1}{2}$	6.45
21541	Mogul Screw Socket.....	16	6.75
21542	*Regent Film Socket.....	16 $\frac{1}{4}$	7.75

#### With 20-inch Radial Bowl, with Extension

21543	Medium Screw Socket.....	16 $\frac{1}{2}$	6.95
21544	Mogul Screw Socket.....	17	7.25
21545	*Regent Film Socket.....	17 $\frac{1}{4}$	8.25

#### With 24-inch Radial Bowl Reflector

21546	Medium Screw Socket.....	18 $\frac{1}{2}$	7.70
21547	Mogul Screw Socket.....	19	8.00
21548	*Regent Film Socket.....	19 $\frac{1}{4}$	9.00

#### With 24-inch Radial Bowl and Acorn Diffuser

21549	Medium Screw Socket.....	27 $\frac{1}{2}$	11.45
21550	Mogul Screw Socket.....	28	11.75
21552	*Regent Film Socket.....	28 $\frac{1}{4}$	12.75

#### With 20-inch Flat Radial Wave Reflector

21553	Medium Screw Socket.....	13	5.20
21554	Mogul Screw Socket.....	13 $\frac{1}{2}$	5.50
21555	*Regent Film Socket.....	13 $\frac{3}{4}$	6.50

#### With 18-inch Concentric Dome Reflector and Small Holophane Refractor

21475	Medium Screw Socket.....	17 $\frac{1}{4}$	9.20
21519	Mogul Screw Socket.....	17 $\frac{3}{4}$	9.50
21551	*Regent Film Socket.....	18	10.50

#### With 20-inch Concentric Dome Reflector and Large Holophane Refractor

21562	Medium Screw Socket.....	22 $\frac{1}{4}$	13.95
21563	Mogul Screw Socket.....	22 $\frac{3}{4}$	14.25
21564	*Regent Film Socket.....	23	15.25

#### With 20-inch Concentric Dome Reflector and Large Sol-Lux Diffuser

21477	Medium Screw Socket.....	18 $\frac{1}{4}$	8.45
21478	Mogul Screw Socket.....	18 $\frac{3}{4}$	8.75
21479	*Regent Film Socket.....	19	9.75

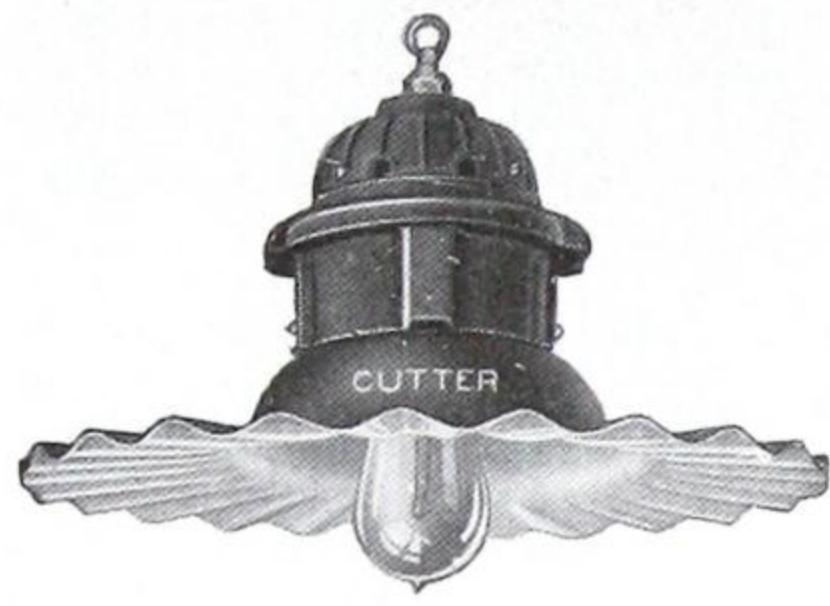
### STYLE DX—LOOP SUSPENSION

Similar to Style D, with Simple Cross-Arm No. 20751, which fits between the canopy and the  $\frac{3}{4}$ -inch adapter. In ordering, use same trade number as for Style D, but with prefix "DX." Add 25 cents to list prices and  $1\frac{1}{2}$  pounds to shipping weights.

#### SUSPENSION PARTS

20751	Simple Cross-Arm.....	1 $\frac{1}{2}$	\$0.25
20753	$\frac{3}{4} \times \frac{7}{16}$ -inch adapter.....	$\frac{1}{2}$	.15
20754	Arc ring with $\frac{7}{16}$ -inch stud.....	$\frac{1}{4}$	.10
20755	H.V. insulator with $\frac{7}{16}$ -inch studs	2 $\frac{1}{4}$	.90

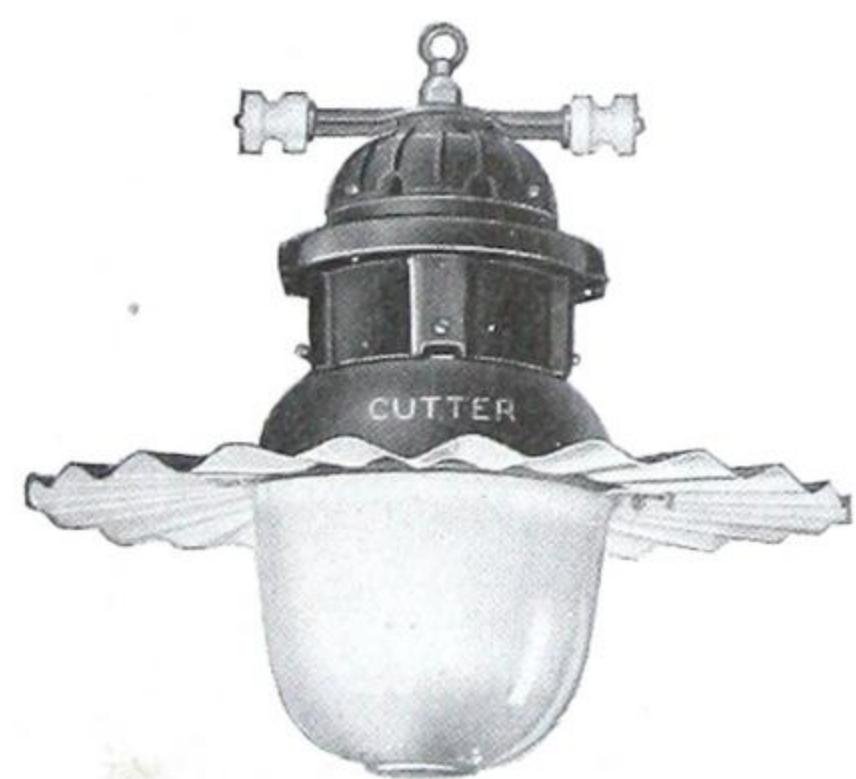
\* Standard Film Socket furnished in place of Regent when so ordered.



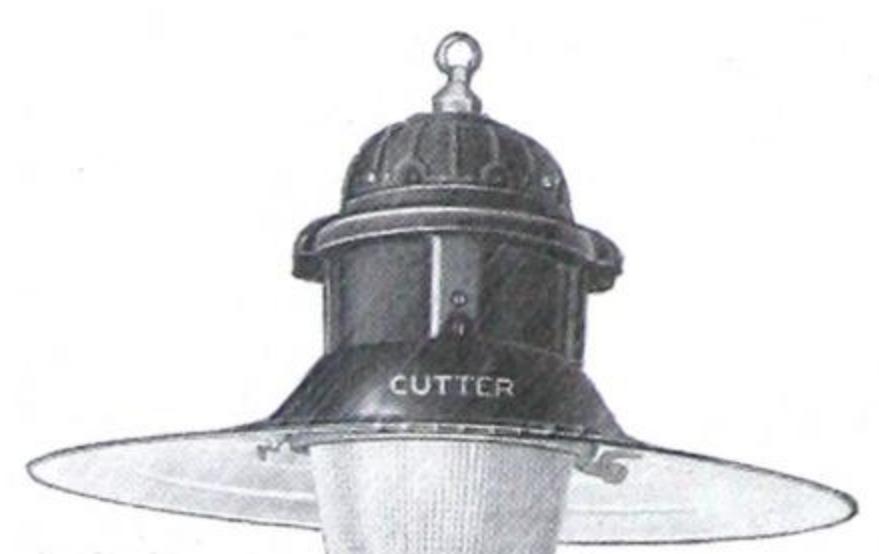
Style D with 18-inch Radial Bowl Reflector



Style D with 20-inch Radial Bowl Reflector with Extension



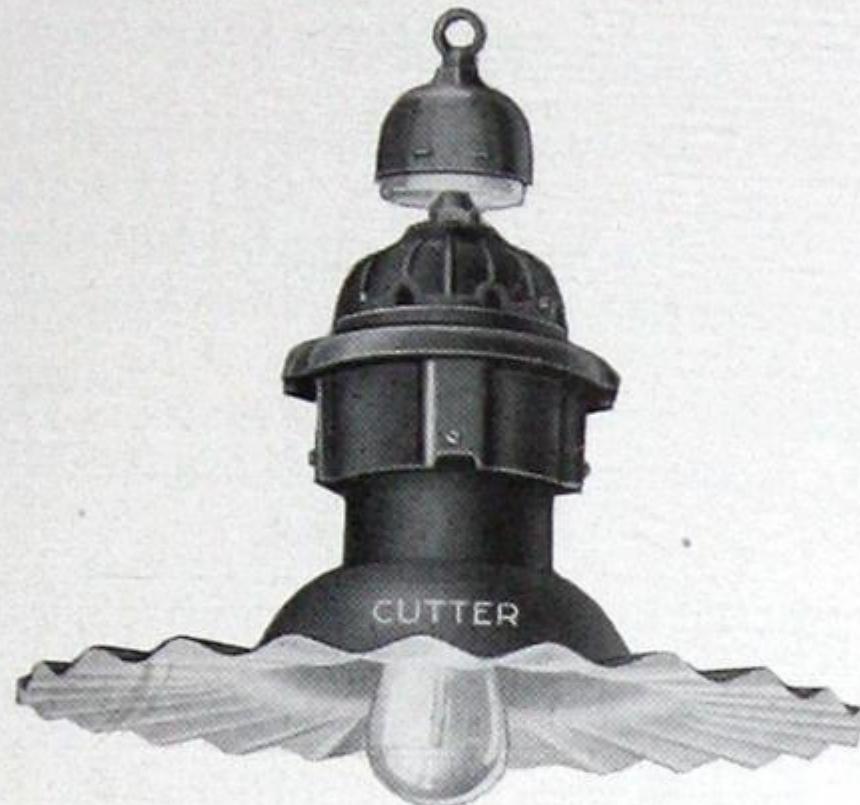
Style DX with 18-inch Radial Bowl Reflector and Refractor



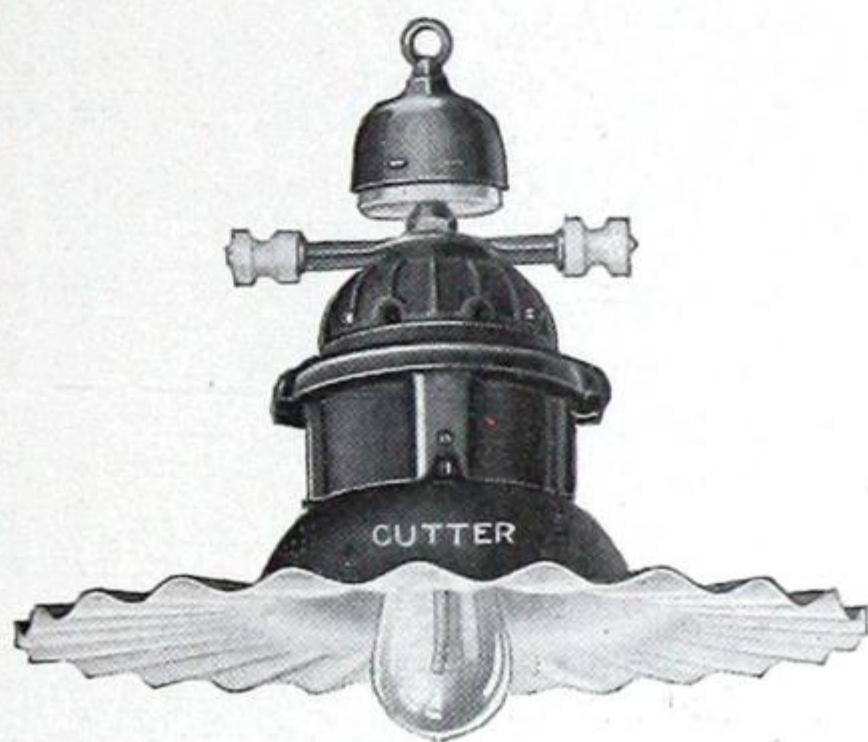
Style D with 18 inch Concentric Dome Reflector and Small Refractor

## CUTTER CENTER SUSPENSION STREETHOODS

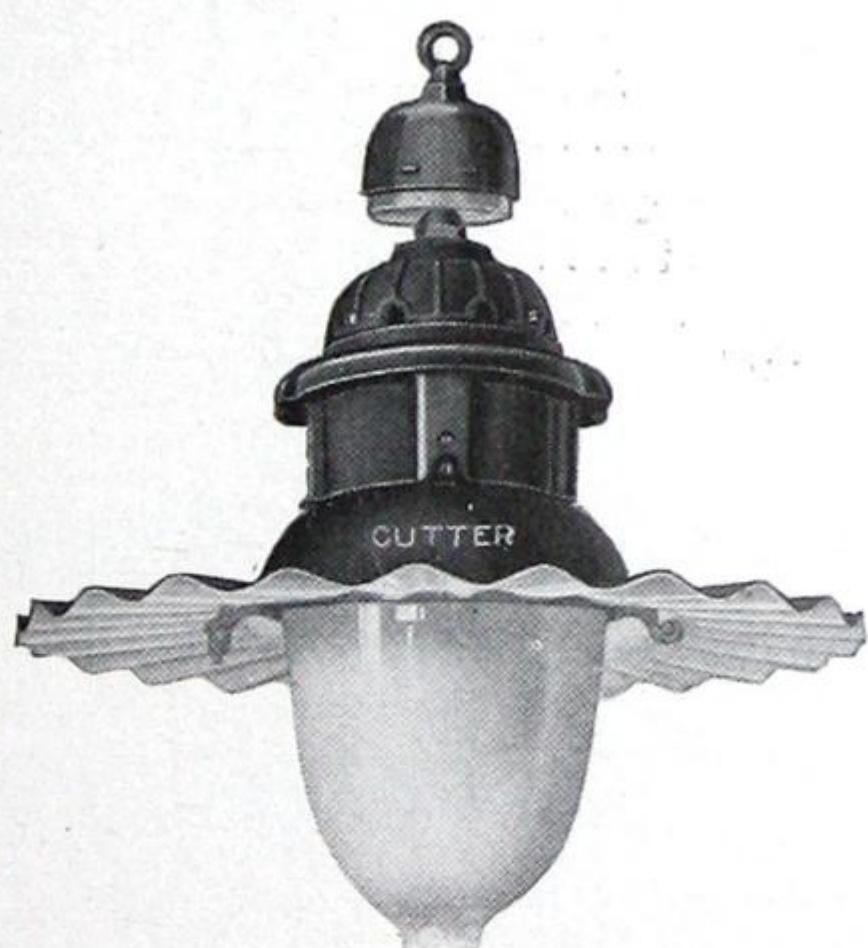
Schedule A—Standard Package Quantity, 20 of One Style or Trade Number



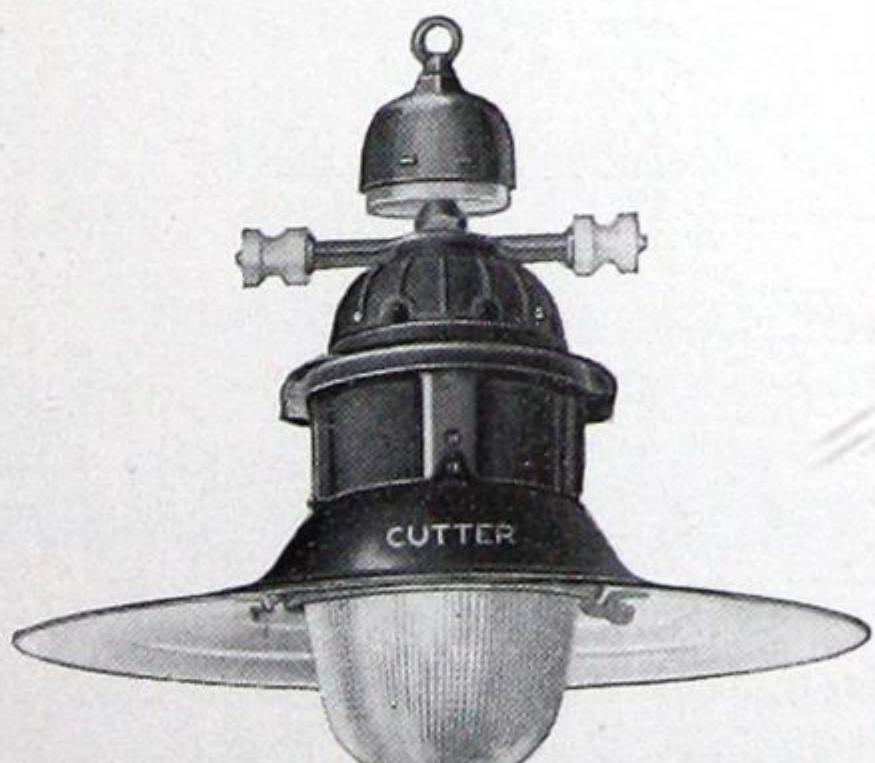
Style E with 18-inch Radial Bowl Reflector



Style EX with 18-inch Radial Bowl Reflector and Simple Cross-arm



Style E with 18-inch Radial Bowl Reflector and Sol-Lux Diffuser



Style EX with 18-inch Concentric Dome Reflector and Small Refractor

## STYLE E—INSULATED LOOP SUSPENSION

Consists of Style D, with a Cutter High Voltage Insulator between the arc ring and adapter.

## With 18-inch Radial Bowl Reflector

Trade No.	Description	Wt., Lbs. Each	Price Each
21571	Medium Screw Socket.....	16½	\$6.85
21572	Mogul Screw Socket.....	17	7.15
21573	*Regent Film Socket.....	17¼	8.15

## With 18-inch Radial Bowl and Large Refractor

21574	Medium Screw Socket.....	24½	15.10
21575	Mogul Screw Socket.....	25	15.40
21576	*Regent Film Socket.....	25¼	16.40

## With 18-inch Radial Bowl and Sol-Lux Diffuser

21568	Medium Screw Socket.....	20½	9.60
21569	Mogul Screw Socket.....	21	9.90
21570	*Regent Film Socket.....	21¼	10.90

## With 20-inch Radial Bowl Reflector

21580	Medium Screw Socket.....	17¾	7.35
21581	Mogul Screw Socket.....	18¼	7.65
21582	*Regent Film Socket.....	18½	8.65

## With 20-inch Radial Bowl, with Extension

21583	Medium Screw Socket.....	18¾	7.85
21584	Mogul Screw Socket.....	19¼	8.15
21587	*Regent Film Socket.....	19½	9.15

## With 24-inch Radial Bowl Reflector

21588	Medium Screw Socket.....	20¾	8.60
21589	Mogul Screw Socket.....	21¼	8.90
21590	*Regent Film Socket.....	21½	9.90

## With 24-inch Radial Bowl and Acorn Diffuser

21591	Medium Screw Socket.....	29¾	12.35
21592	Mogul Screw Socket.....	30¼	12.65
21593	*Regent Film Socket.....	30½	13.65

## With 20-inch Flat Radial Wave Reflector

21594	Medium Screw Socket.....	15¼	6.10
21595	Mogul Screw Socket.....	16½	6.40
21596	*Regent Film Socket.....	16¾	7.40

## With 18-inch Concentric Dome Reflector and Small Holophane Refractor

21601	Medium screw socket.....	19½	10.10
21602	Mogul Screw Socket.....	20	10.40
21603	*Regent Film Socket.....	20¼	11.40

## With 20-inch Concentric Dome Reflector and Large Holophane Refractor

21607	Medium screw socket.....	24½	14.85
21608	Mogul Screw Socket.....	25	15.15
21609	*Regent Film Socket.....	25¼	16.15

## With 20-inch Concentric Dome Reflector and Large Sol-Lux Diffuser

21613	Medium screw socket.....	20¼	9.35
21614	Mogul Screw Socket.....	20¾	9.65
21615	*Regent Film Socket.....	21	10.65

## STYLE EX—INSULATED LOOP SUSPENSION

Consists of Style E with Simple Cross-Arm No. 20751. In ordering, use trade numbers for Style E fixtures with prefix "EX." Add 25 cents to list prices and 1½ pounds to shipping weights.

## SUSPENSION PARTS

20751	Simple Cross-Arm.....	1½	\$0.25
20753	¾ x 7/16-inch adapter.....	½	.15
20754	Arc ring with 7/16-inch stud.....	¼	.10
20755	H.V. insulator with 7/16-inch studs	2½	.90

\* Standard Film Socket furnished in place of Regent when so ordered.

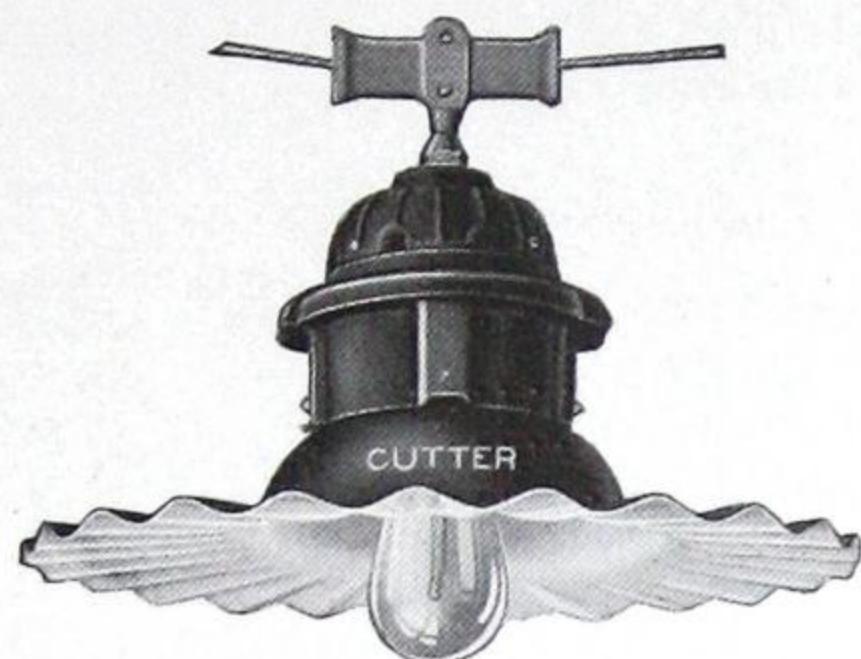
## CUTTER CENTER SUSPENSION STREETHOODS

Schedule A—Standard Package Quantity, 20 of One Style or Trade Number

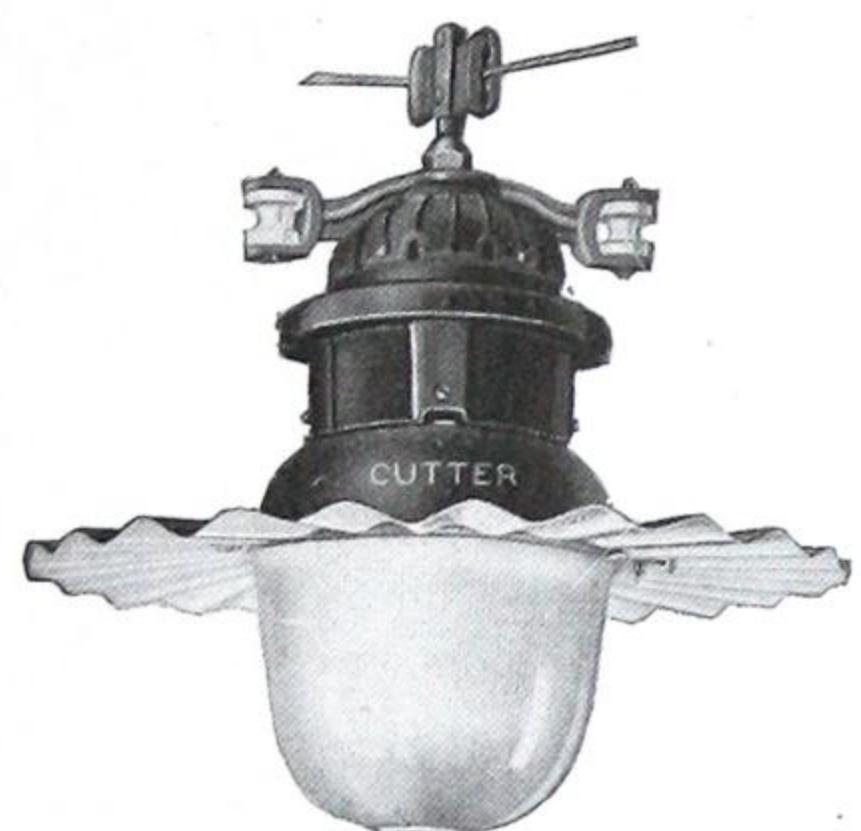
## STYLE F—CABLE GRIP SUSPENSION

Consists of a streethood body with  $\frac{3}{4}$ -inch adapter and cable clamp. This clamp permits the cable to enter at one point on one side and at a higher or lower point on the other side so the fixture can be made level irrespective of the varying heights of cable attachments.

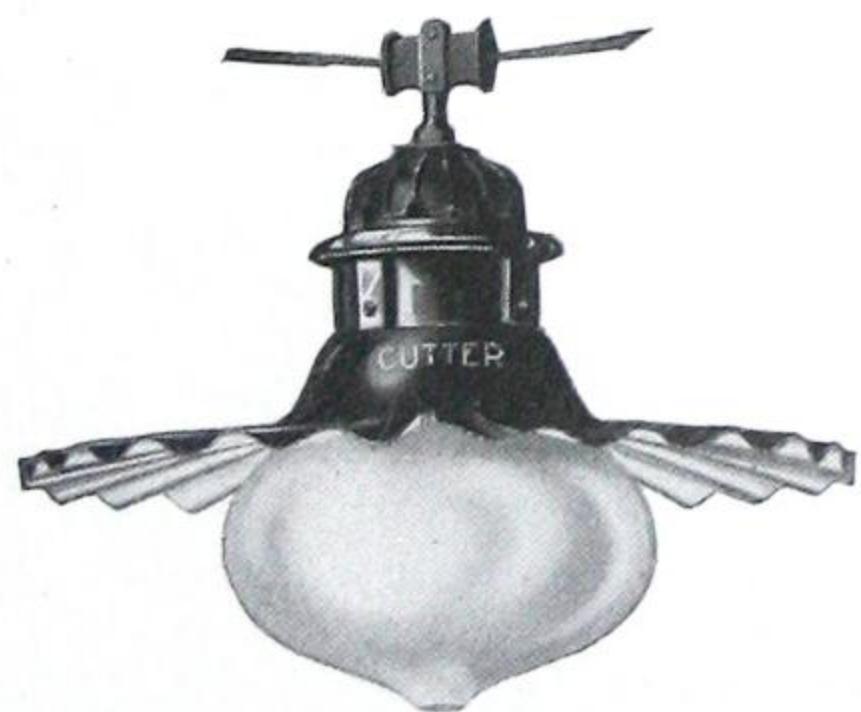
With this style of fixture, no cross-arm is used. The line wires are looped into holes in the rim of the porcelain and tied securely in place.



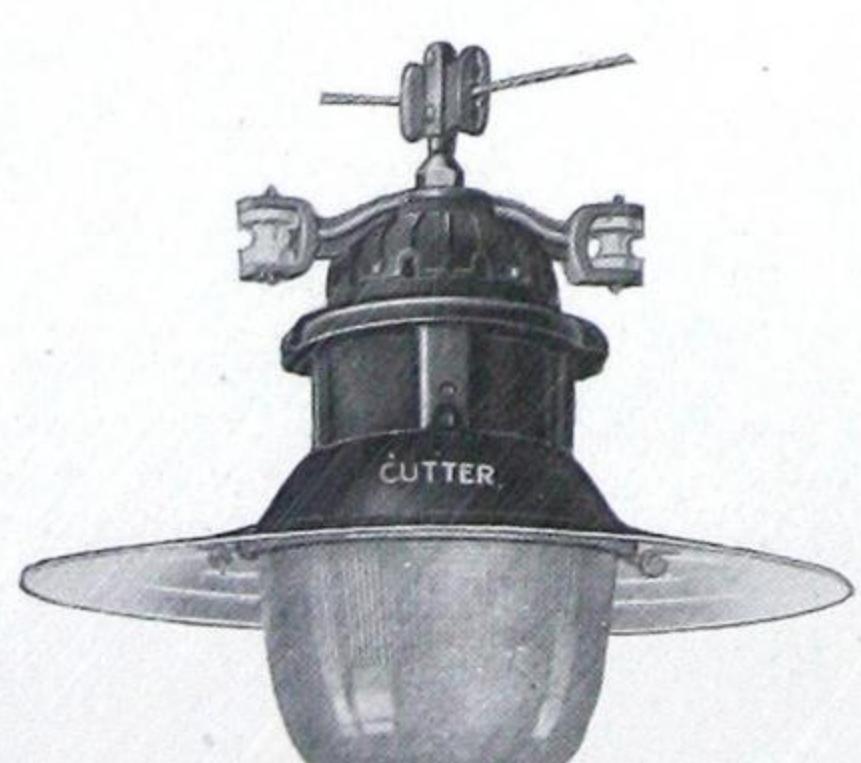
Style F with 18-inch Radial Bowl Reflector



Style FX with 18-inch Radial Bowl Reflector and Large Refractor



Style F with 24-inch Radial Bowl Reflector and Acorn Diffuser



Style FX with 20-inch Concentric Dome Reflector with Large Refractor

## With 18-inch Radial Bowl Reflector

Trade No.	Description	Wt., Lb.	Price Each
21843	Medium Screw Socket.....	16 $\frac{1}{4}$	\$6.35
21844	Mogul Screw Socket.....	16 $\frac{3}{4}$	6.65
21845	*Regent Film Socket.....	17	7.65

## With 18-inch Radial Bowl and Large Refractor

21846	Medium Screw Socket.....	24 $\frac{1}{4}$	14.60
21847	Mogul Screw Socket.....	24 $\frac{3}{4}$	14.90
21848	*Regent Film Socket.....	25	15.90

## With 18-inch Radial Bowl and Sol-Lux Diffuser

21616	Medium Screw Socket.....	20 $\frac{1}{4}$	9.10
21617	Mogul Screw Socket.....	20 $\frac{3}{4}$	9.40
21618	*Regent Film Socket.....	21	10.40

## With 20-inch Radial Bowl Reflector

21852	Medium Screw Socket.....	17 $\frac{1}{2}$	6.85
21853	Mogul Screw Socket.....	17 $\frac{3}{4}$	7.15
21854	*Regent Film Socket.....	18	8.15

## With 20-inch Radial Bowl with Extension

21855	Medium Screw Socket.....	18 $\frac{1}{2}$	7.35
21856	Mogul Screw Socket.....	19	7.65
21857	*Regent Film Socket.....	19 $\frac{1}{4}$	8.65

## With 24-inch Radial Bowl Reflector

21858	Medium Screw Socket.....	20 $\frac{1}{2}$	8.10
21859	Mogul Screw Socket.....	21	8.40
21862	*Regent Film Socket.....	21 $\frac{1}{4}$	9.40

## With 24-inch Radial Bowl and Acorn Diffuser

21863	Medium Screw Socket.....	29 $\frac{1}{2}$	11.85
21864	Mogul Screw Socket.....	30	12.15
21865	*Regent Film Socket.....	30 $\frac{1}{4}$	13.15

## With 20-inch Flat Radial Wave Reflector

21866	Medium Screw Socket.....	15	5.60
21867	Mogul Screw Socket.....	15 $\frac{1}{2}$	5.90
21868	*Regent Film Socket.....	15 $\frac{3}{4}$	6.90

## With 18-inch Concentric Dome Reflector and Small Holophane Refractor

21619	Medium Screw Socket.....	19 $\frac{1}{4}$	9.60
21620	Mogul Screw Socket.....	19 $\frac{3}{4}$	9.90
21621	*Regent Film Socket.....	20	10.90

## With 20-inch Concentric Dome Reflector and Large Holophane Refractor

21622	Medium Screw Socket.....	24 $\frac{1}{4}$	14.35
21623	Mogul Screw Socket.....	24 $\frac{3}{4}$	14.65
21624	*Regent Film Socket.....	25	15.65

## With 20-inch Concentric Dome Reflector and Large Sol-Lux Diffuser

21763	Medium Screw Socket.....	20 $\frac{1}{4}$	8.85
21764	Mogul Screw Socket.....	20 $\frac{3}{4}$	9.15
21765	*Regent Film Socket.....	21	10.15

## STYLE FX—CABLE GRIP SUSPENSION

Consists of Style F with a Cable Cross-Arm No. 20756. In ordering, use trade numbers of Style F fixtures with prefix "FX." Add 40 cents to list and 2 pounds to shipping weights.

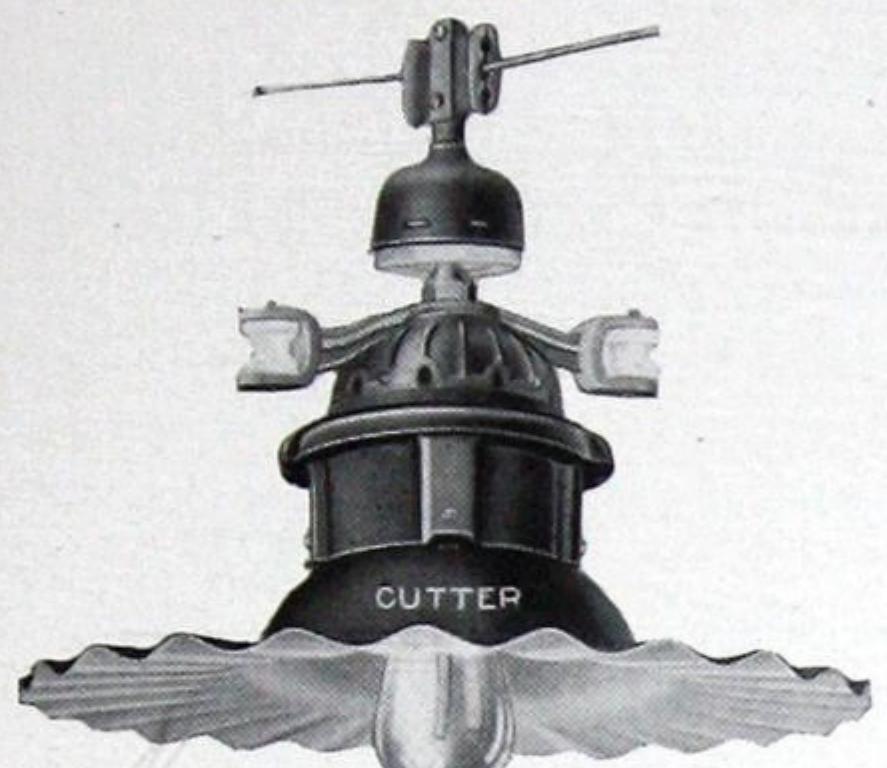
## SUSPENSION PARTS

20756	Cable Cross-Arm.....	2	\$0.40
20757	Cable Grip Clamp.....	2 $\frac{1}{4}$	.50

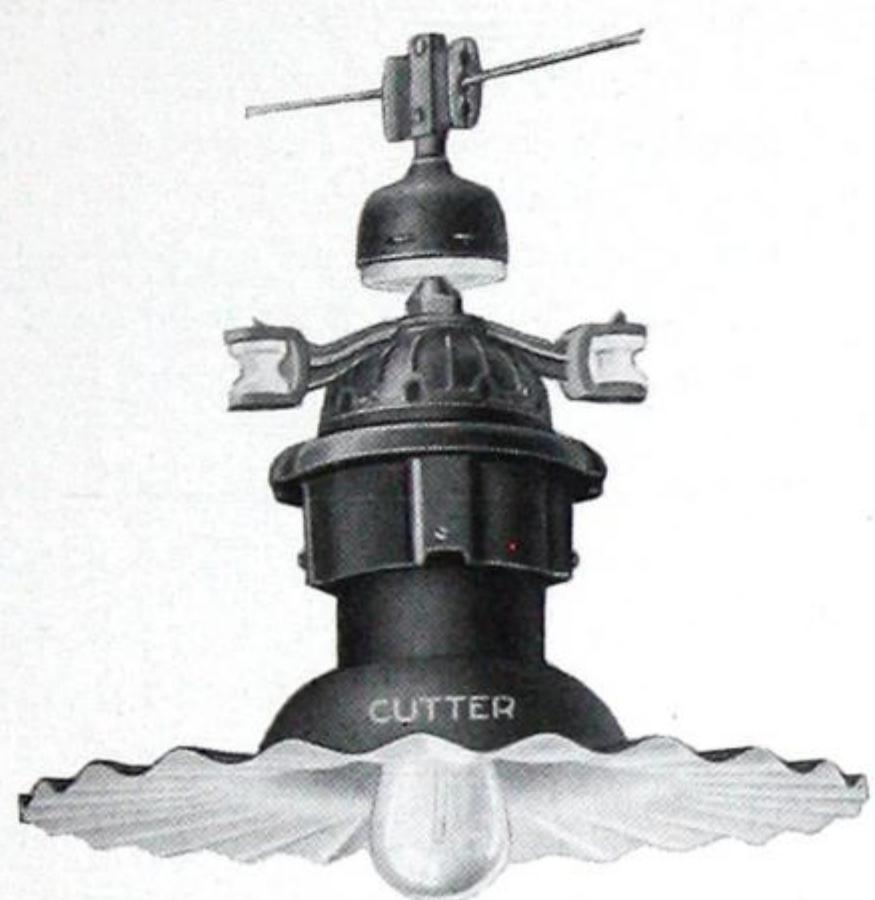
\* Standard film socket furnished in place of Regent when so ordered.

## CUTTER CENTER SUSPENSION STREETHOODS

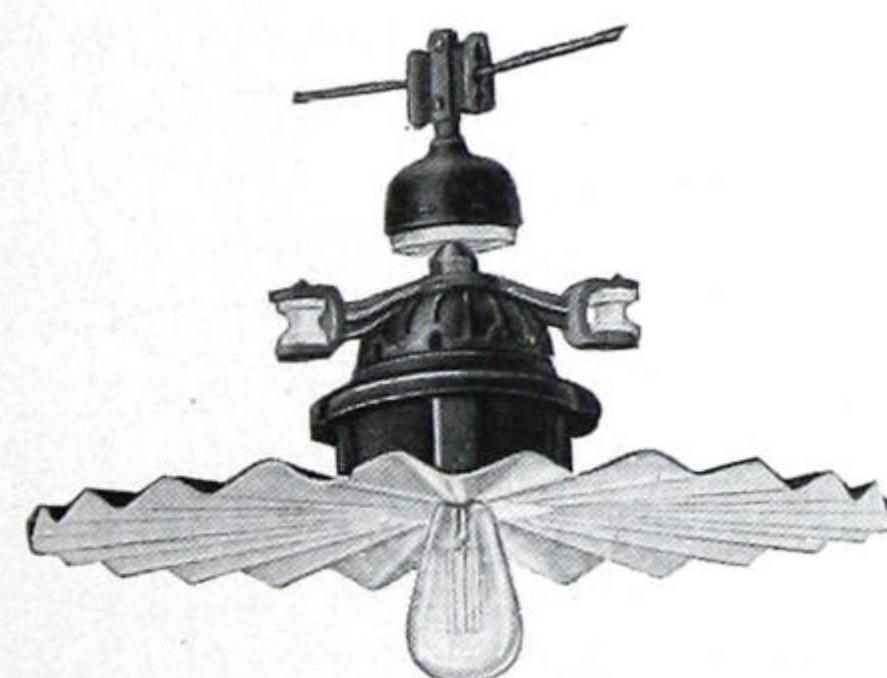
Schedule A—Standard Package Quantity, 20 of One Style or Trade Number



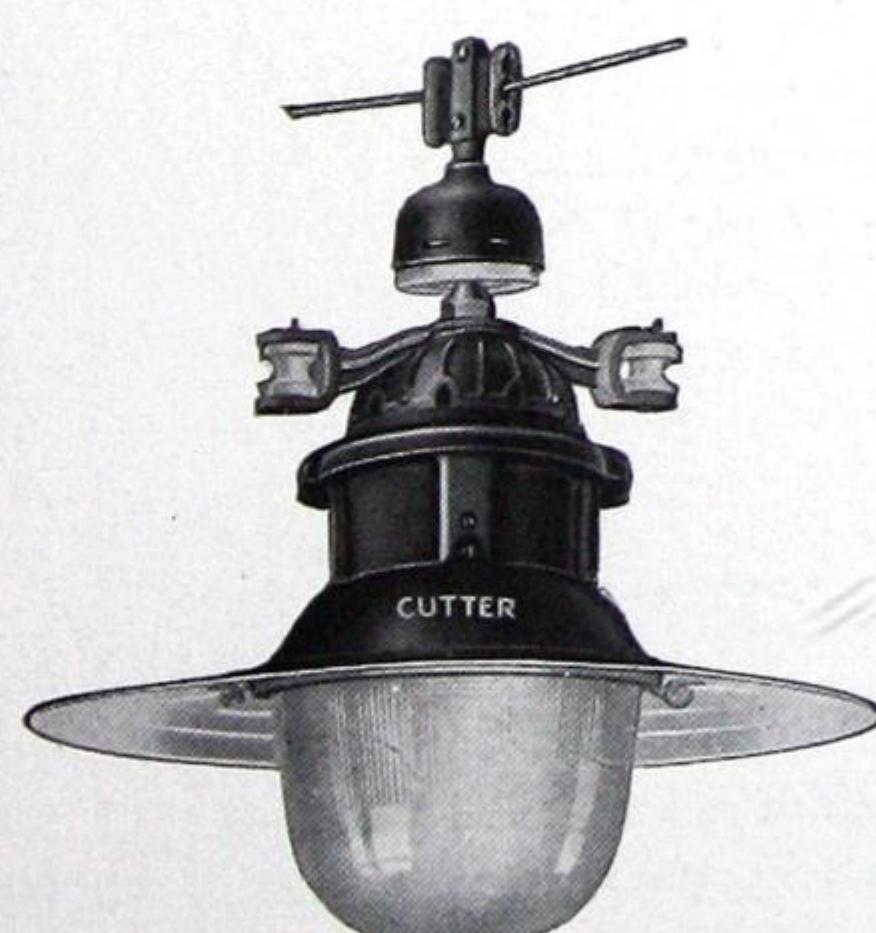
Style GX with 18-inch Radial Bowl Reflector



Style GX with 20-inch Radial Bowl Reflector with Extension



Style GX with 20-inch flat Radial Wave Reflector



Style GX with 20-inch Concentric Dome Reflector and Large Refractor

## STYLE G—INSULATED CABLE GRIP SUSPENSION

Similar to Style F, with a Cutter High Voltage Insulator between the adapter and cable clamp.

## With 18-inch Radial Bowl Reflector

Trade No.	Description	Wt., Lbs.	Price Each
21884	Medium Screw Socket.....	18½	\$7.25
21885	Mogul Screw Socket.....	19	7.55
21886	*Regent Film Socket.....	19¼	8.55

## With 18-inch Radial Bowl Reflector and Large Holophane Refractor

21887	Medium Screw Socket.....	26½	15.50
21888	Mogul Screw Socket.....	27	15.80
21889	*Regent Film Socket.....	27¼	16.80

## With 18-inch Radial Bowl and Sol-Lux Diffuser

21770	Medium Screw Socket.....	22½	10.00
21771	Mogul Screw Socket.....	23	10.30
21772	*Regent Film Socket.....	23¼	11.30

## With 20-inch Radial Bowl Reflector

21893	Medium Screw Socket.....	19¾	7.75
21894	Mogul Screw Socket.....	20¼	8.05
21895	*Regent Film Socket.....	20½	9.05

## With 20-inch Radial Bowl, with Extension

21896	Medium Screw Socket.....	20¾	8.25
21897	Mogul Screw Socket.....	21¼	8.55
21898	*Regent Film Socket.....	21½	9.55

## With 24-inch Radial Bowl Reflector

21899	Medium Screw Socket.....	22¾	9.00
21900	Mogul Screw Socket.....	23¼	9.30
21901	*Regent Film Socket.....	23½	10.30

## With 24-inch Radial Bowl and Acorn Diffuser

21902	Medium Screw Socket.....	31¾	12.75
21903	Mogul Screw Socket.....	32¼	13.05
21904	*Regent Film Socket.....	32½	14.05

## With 20-inch Radial Wave Reflector

21905	Medium Screw Socket.....	17¼	6.50
21906	Mogul Screw Socket.....	17¾	6.80
21907	*Regent Film Socket.....	18	7.80

## With 18-inch Concentric Dome Reflector and Small Holophane Refractor

21773	Medium Screw Socket .....	21½	10.50
21774	Mogul Screw Socket .....	22	10.80
21775	*Regent Film Socket.....	22¼	11.80

## With 20-inch Concentric Dome Reflector and Large Holophane Refractor

21776	Medium Screw Socket .....	26½	15.25
21777	Mogul Screw Socket .....	27	15.55
21778	*Regent Film Socket.....	27¼	16.55

## With 20-inch Concentric Dome Reflector and Sol-Lux Diffuser

21779	Medium Screw Socket .....	22½	9.75
21780	Mogul Screw Socket .....	23	10.05
21781	*Regent Film Socket.....	23¼	11.05

## STYLE GX—INSULATED CABLE GRIP SUSPENSION

Same as Style G, with a Cable Cross-Arm No. 20756. In ordering, use trade numbers of Style G fixtures with prefix "GX." Add 40 cents to list prices and 2 pounds to shipping weights.

## SUSPENSION PARTS

20756	Cable Cross-Arm.....	2	\$0.40
20757	Cable Grip Clamp.....	2¼	.50

\* Standard film socket furnished in place of Regent when so ordered.

## CUTTER INVERTED CONE STREETHOOD BODIES

### Schedule A—Standard Package Quantity, 20 of One Style or Trade Number

Inverted Cone Streethood Bodies are made in two sizes with 18 and 22-inch hoods, respectively. The same reflector is used with both. The reflector shape, which resembles the frustum of an inverted cone, is designed to throw the reflected rays out at a distance where they are needed to help the direct rays of the lamp. The hood overlaps the reflector so that most of the light passing above the horizontal is redirected into useful planes. Distribution curves show that the 18-inch size gives splendid results with 60, 80 and 100 candle power series lamps and small multiple lamps. The 22-inch size gives higher efficiency with the same lamps and is always recommended for 100 and 250 candle power series lamps.

Bodies listed below are for use with brackets illustrated on a following page. An Inverted Cone Body consists of a hood top, reflector, hood fork with  $\frac{3}{4}$ -inch rigid male nipple and with or without socket, according to list. Hood flanges for  $\frac{1}{2}$  and  $\frac{3}{4}$ -inch pipe are extra.

The hoods and reflectors are made of special deep drawing steel and finished in either high grade weather-resisting baked paint enamel or porcelain enamel.

The hood fork has a flange near the top which fits directly beneath the upper portion of the hood. The  $\frac{3}{4}$ -inch nipple is made a rigid part of the flange, projecting above it for connection to the cross-arm of outer-wired brackets or to the hood flange which is screwed on the outer end of inner-wired brackets. Prices of hood flanges listed under extra parts below.

### CUTTER INVERTED CONE STREETHOOD BODIES With 18-inch Hood—Paint Enamel Finish

Trade No.	Description	Wt., Lbs. Each	Price Each
21682	Medium Screw Socket.....	5 $\frac{1}{2}$	\$1.90
21683	Mogul Screw Socket.....	5 $\frac{3}{4}$	2.20
21684	Regent Film Socket.....	6	3.20
21685	Without Socket.....	4 $\frac{3}{4}$	1.40

### With 18-inch Hood—Porcelain Enamel Finish

21686	Medium Screw Socket.....	6 $\frac{3}{4}$	3.40
21687	Mogul Screw Socket.....	7	3.70
21688	Regent Film Socket.....	7 $\frac{1}{4}$	4.70
21689	Without Socket.....	6 $\frac{1}{2}$	2.90

### With 22-inch Hood—Paint Enamel Finish

21690	Medium Screw Socket.....	7 $\frac{3}{4}$	2.50
21691	Mogul Screw Socket.....	8	2.80
21692	Regent Film Socket.....	8 $\frac{1}{4}$	3.80
21693	Without Socket.....	7	2.00

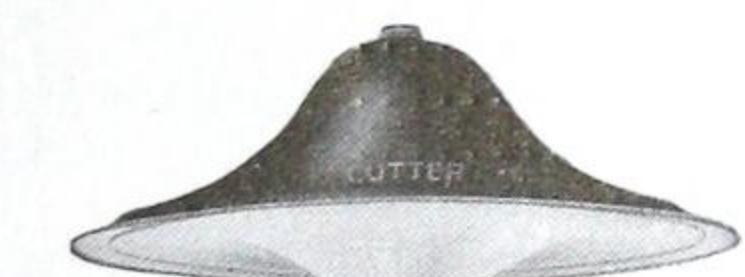
### With 22-inch Hood—Porcelain Enamel Finish

21694	Medium Screw Socket.....	9 $\frac{3}{4}$	4.20
21695	Mogul Screw Socket.....	10	4.50
21696	Regent Film Socket.....	10 $\frac{1}{4}$	5.50
21697	Without Socket.....	9	3.70

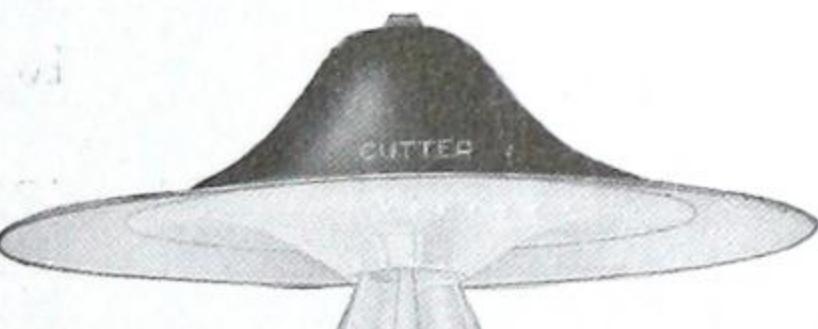
### EXTRA PARTS AND SPECIAL FINISHES

21517	Hood flange for $\frac{1}{2}$ -in. pipe, $\frac{3}{4}$ -in. nipple.....	$\frac{1}{2}$	.15
21518	Hood flange for $\frac{3}{4}$ -in. pipe, $\frac{3}{4}$ -in. nipple.....	$\frac{1}{2}$	.15
21698	18-in. hood, paint enameled....	2 $\frac{5}{8}$	.60
21699	18-in. hood, porcelain enameled.	3	1.50
21705	18-in. hood, galvanized and painted.....	2 $\frac{5}{8}$	1.00
21706	18-inch hood, copper.....	3	3.00
21707	22-in. hood, paint enameled....	4 $\frac{3}{4}$	1.20
21708	22-in. hood, porcelain enameled.	6 $\frac{1}{4}$	2.30
21709	22-in. hood, galvanized and painted.....	4 $\frac{3}{4}$	1.65
21710	Reflector, paint enameled.....	2 $\frac{1}{8}$	.60
21711	Reflector, porcelain enameled..	2 $\frac{1}{8}$	1.20
21712	Reflector, nickelized copper.....	2 $\frac{5}{8}$	3.50
21713	Hood fork, $\frac{3}{4}$ -in. rigid nipple..	$\frac{1}{4}$	.20

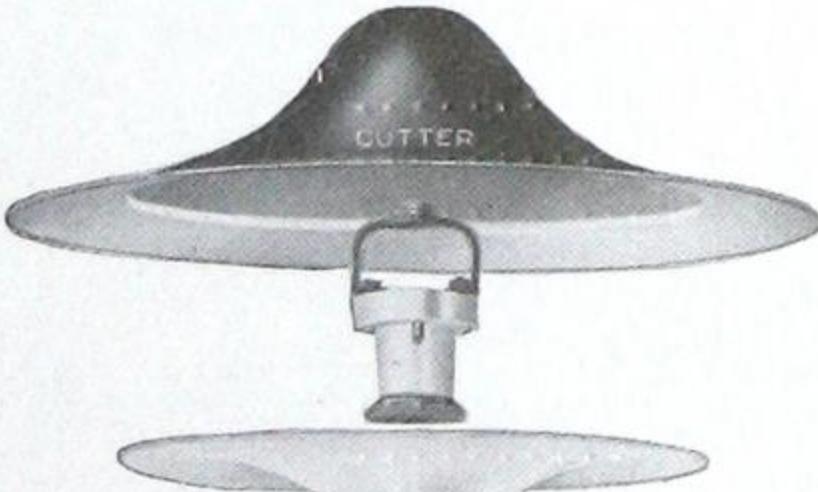
Standard film sockets will be furnished when so ordered.



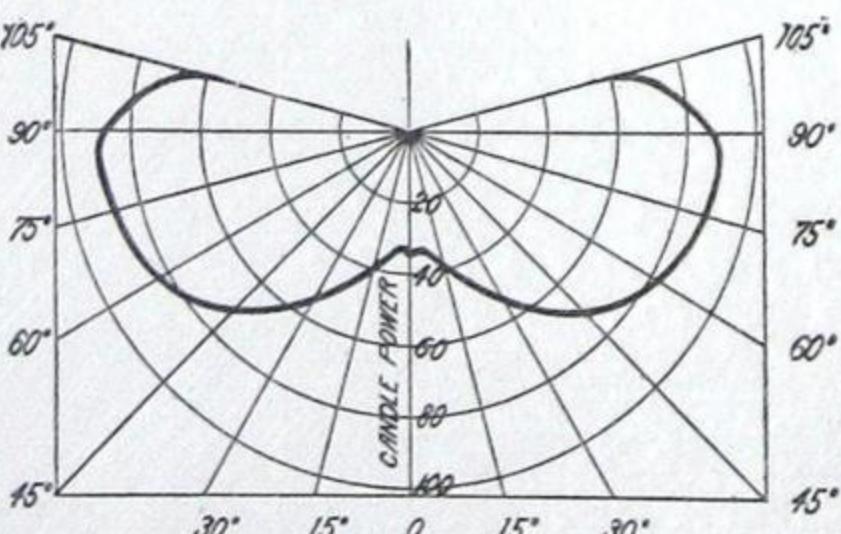
18-inch Inverted Cone Streethood Body



22-inch Inverted Cone Streethood Body



22-inch Hood, Reflector and  
Regent Film Socket with  
Hood Fork and  $\frac{3}{4}$ -inch  
Rigid Nipple

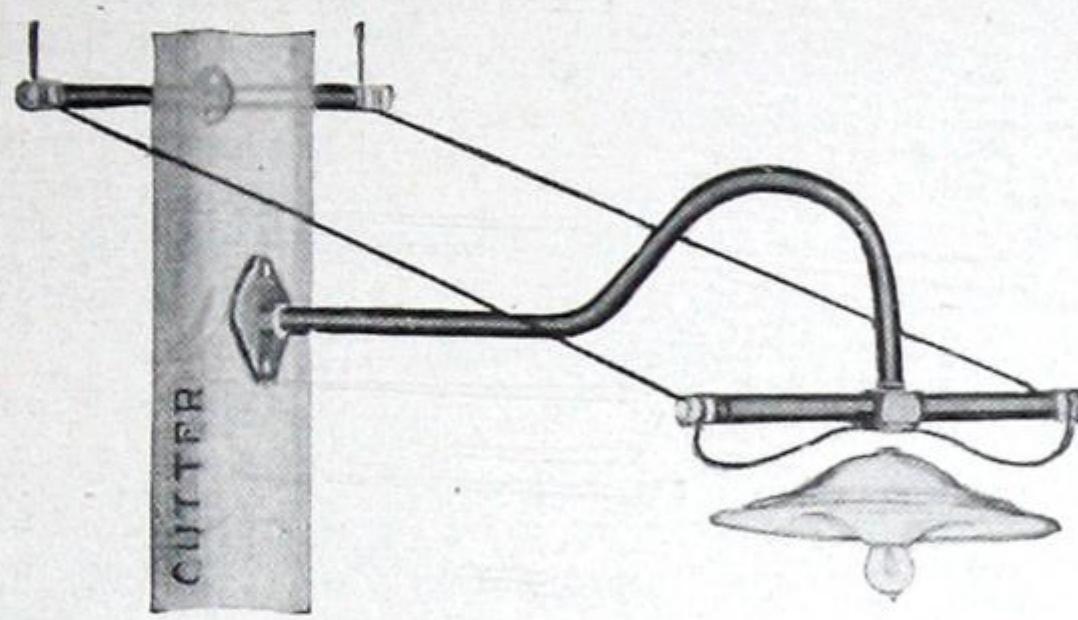


Distribution Curve for 80 C. P. Lamp  
and 18-inch Inverted Cone  
Streethood Body

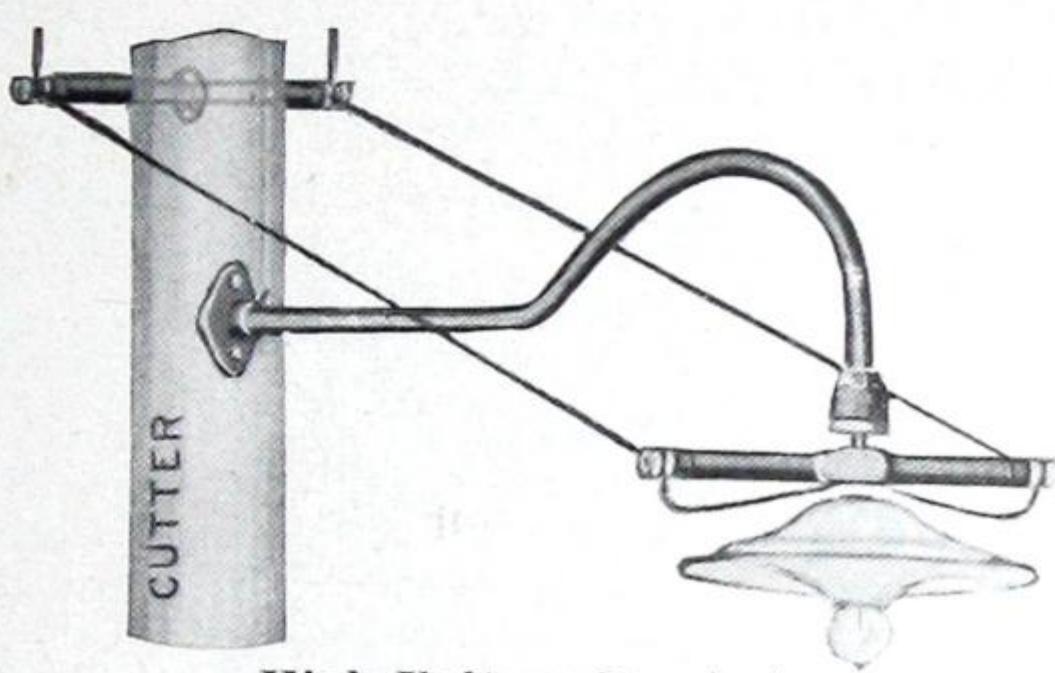
## CUTTER INCANDESCENT BRACKETS FOR STREETHOOD BODIES

### Schedule A—Standard Package Quantity, 20 of One Style or Trade Number

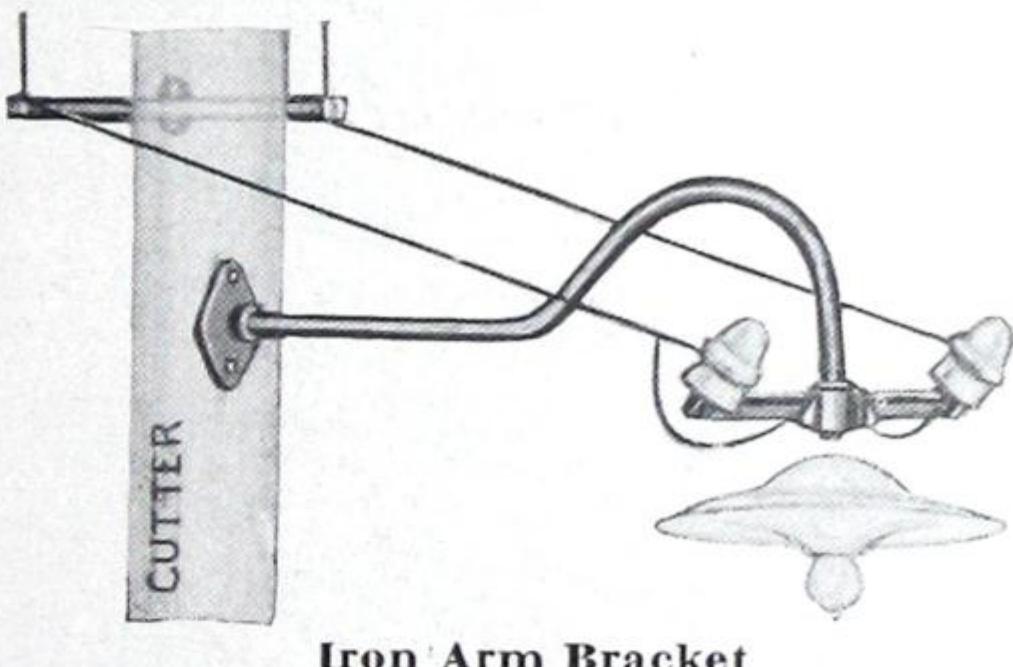
Brackets listed on this page are designed for use with Inverted Cone Streethood Bodies shown on preceding page. Prices include cross-arms which are threaded underneath for  $\frac{3}{4}$ -inch nipple. Hood forks furnished with sockets for 18 and 22-inch Inverted Cone Streethood Bodies have rigid  $\frac{3}{4}$ -inch nipples. The flanged portion of the hood fork fits the lower surface of the hood top, clamping it securely to the cross-arm. Prices do not include hoods, reflectors or sockets. Order Inverted Cone Streethood Bodies separately as listed on preceding page.



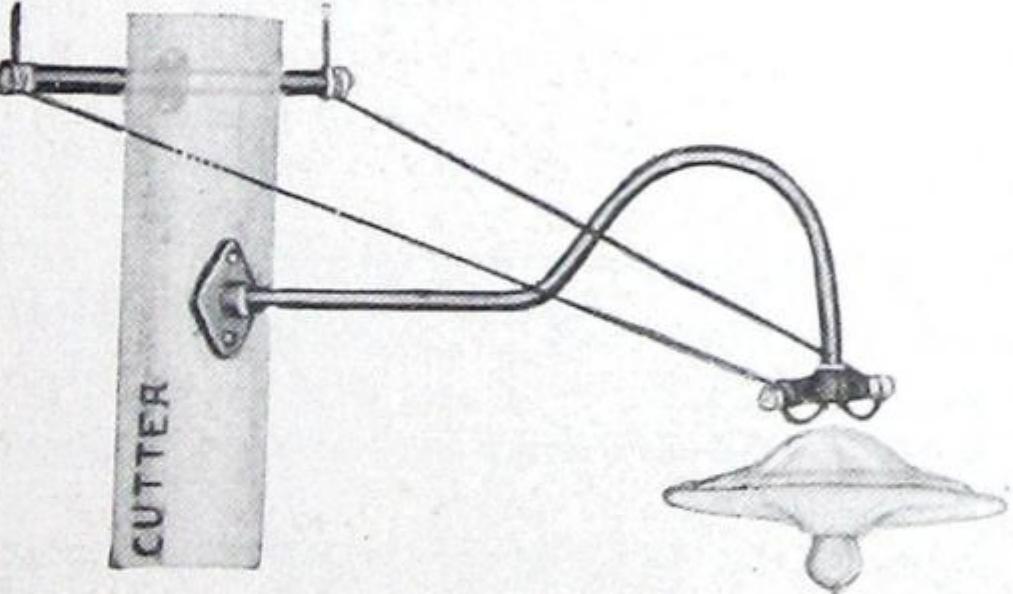
Standard Bracket



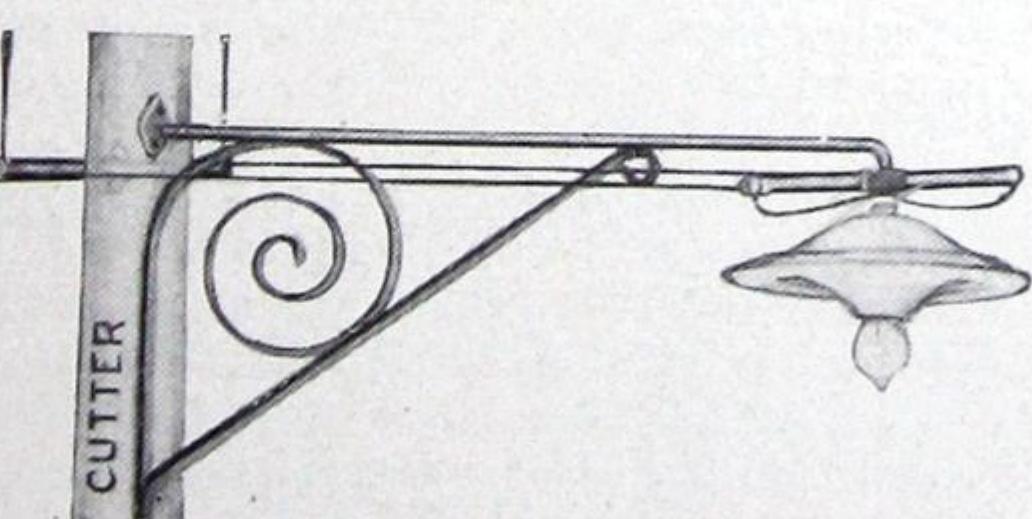
High Voltage Bracket



Iron Arm Bracket



Urban Bracket



Boulevard Bracket

### STANDARD BRACKETS

Has a 3-foot gooseneck of  $\frac{1}{2}$ -inch pipe, pole plate and enameled wood cross-arm with metal bound ends (to prevent splitting) and with wireable waste nut fastened to the arm. The brace arm shown on the back of the pole is used to guide the line wires to the cross-arm. This method of wiring holds the fixture steady in stormy weather.

Trade No.	Description	Wt., Lbs.	Price Each
21923	With Brace Arm.....	10	\$1.75
21924	Without Brace Arm.....	7	1.20

### RAILWAY BRACKETS

Similar to the Standard Bracket, with a clamp for iron pipe in place of the pole plate. Prices below do not include brace arm.

21925	For 2 $\frac{1}{2}$ -inch (bore) Pipe...	8	1.35
21926	For 3-inch (bore) Pipe....	9	1.45
21927	For 4-inch (bore) Pipe....	10	1.65
21928	For 5-inch (bore) Pipe....	11	1.85

### HIGH VOLTAGE BRACKETS

Consists of the Standard Bracket with a Cutter High Voltage Insulator between the gooseneck and cross-arm. This prevents grounds and leakage of current on high potential circuits. Prices below do not include streethood bodies.

21929	With Brace Arm.....	12 $\frac{1}{2}$	2.65
21930	Without Brace Arm.....	9 $\frac{1}{2}$	2.10

### IRON ARM BRACKETS

Similar to the Standard Bracket, with an iron cross-arm supporting glass insulators. Prices do not include streethood bodies.

21931	With Brace Arm.....	13	2.05
21932	Without Brace Arm.....	10	1.50

### EASTERN BRACKETS

Consists of the Iron Arm Bracket with a Cutter High Voltage Insulator between the gooseneck and iron cross-arm. Prices do not include streethood bodies.

21933	With Brace Arm.....	16	2.95
21934	Without Brace Arm.....	13	2.40

### URBAN BRACKETS

The spreader on the end of the gooseneck has a fiber insulator to separate it from the streethood proper, thus reducing the risk of leakage on circuits up to 600 volts. Furnished with 3-foot gooseneck of  $\frac{1}{2}$ -inch pipe. Prices do not include streethood bodies.

21935	With Brace Arm.....	11	2.25
21936	Without Brace Arm.....	8	1.70

### BOULEVARD BRACKETS

Furnished with pole plate, cross-arm, and 5-foot gooseneck of  $\frac{1}{2}$ -inch pipe ornamented with wrought iron scrolls. Prices do not include streethood bodies.

21937	With Brace Arm.....	17	3.05
21938	Without Brace Arm.....	14	2.50

### AVENUE BRACKETS

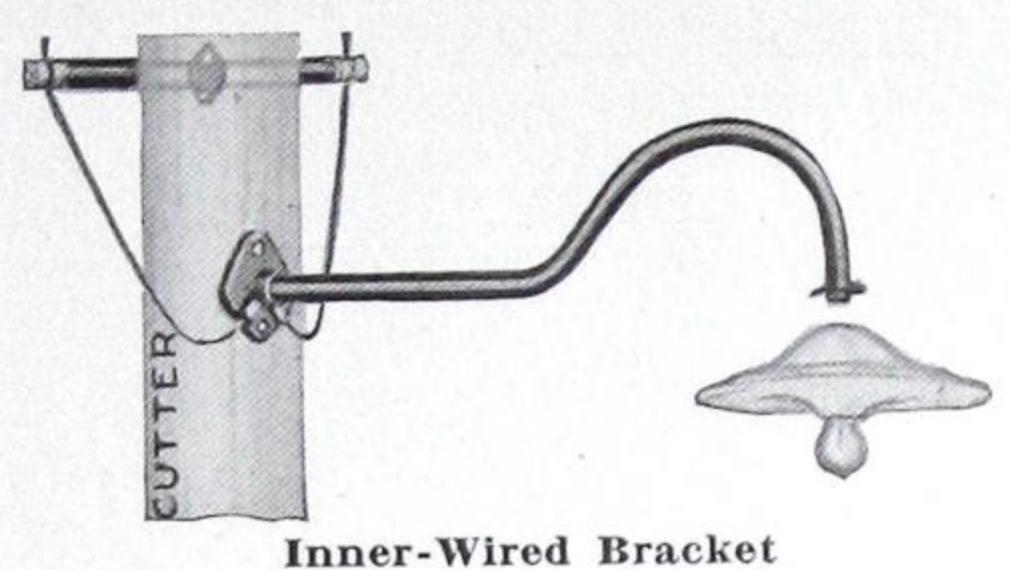
Same as the Boulevard Bracket, with a Cutter High Voltage Insulating Joint between the gooseneck and cross-arm. Prices do not include streethood bodies.

21939	With Brace Arm.....	20	3.95
21940	Without Brace Arm.....	17	3.40

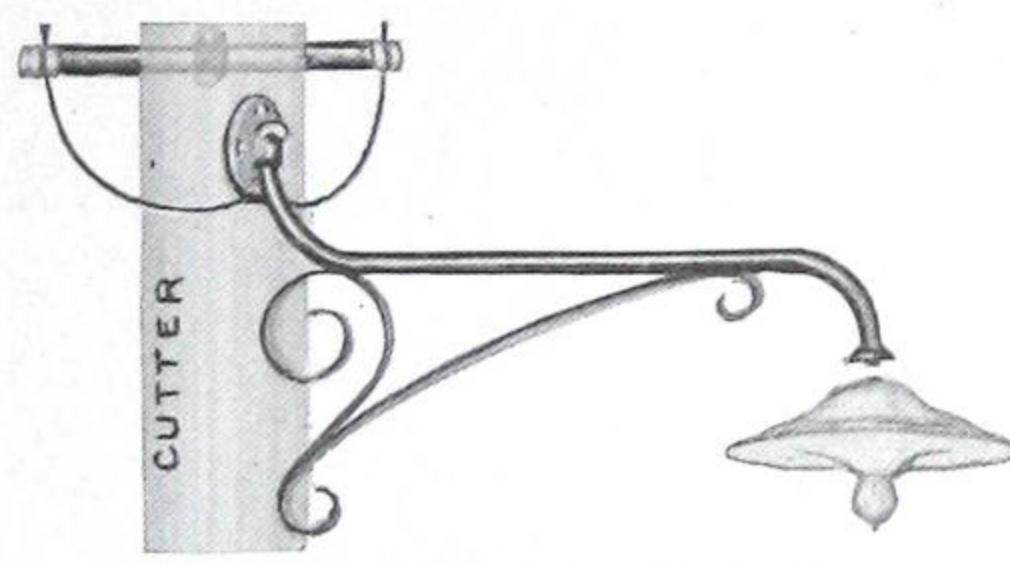
## CUTTER INCANDESCENT BRACKETS FOR STREETHOOD BODIES

### Schedule A—Standard Package Quantity, 20 of One Style or Trade Number

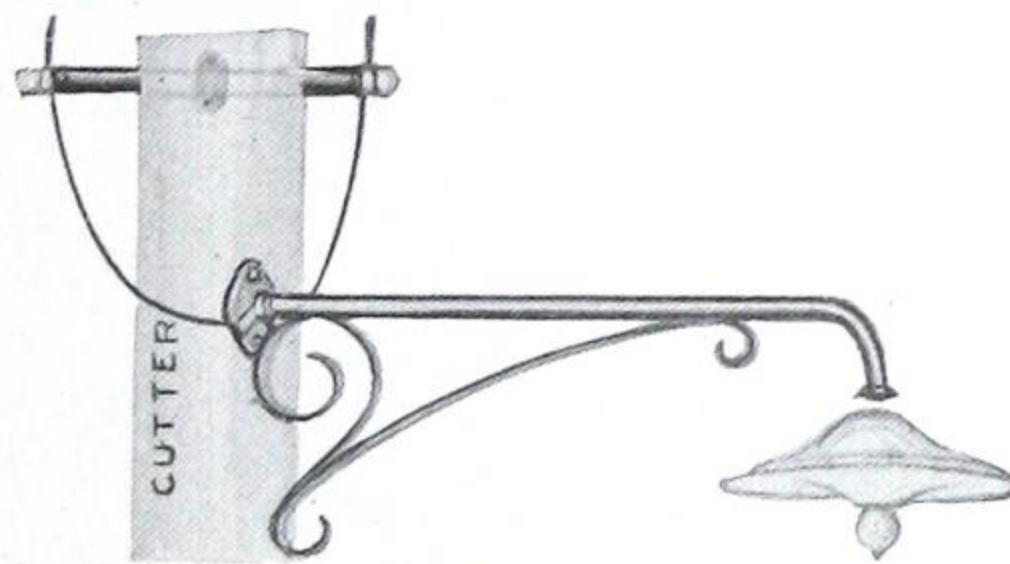
Brackets listed on this page are designed for inner-wired fixtures using Inverted Cone Streethood Bodies described and listed on a preceding page. The outer end of the gooseneck is fitted with a hood flange tapped for the  $\frac{3}{4}$ -inch hood fork nipple. Prices of brackets do not include hoods, reflectors, sockets or hood forks.



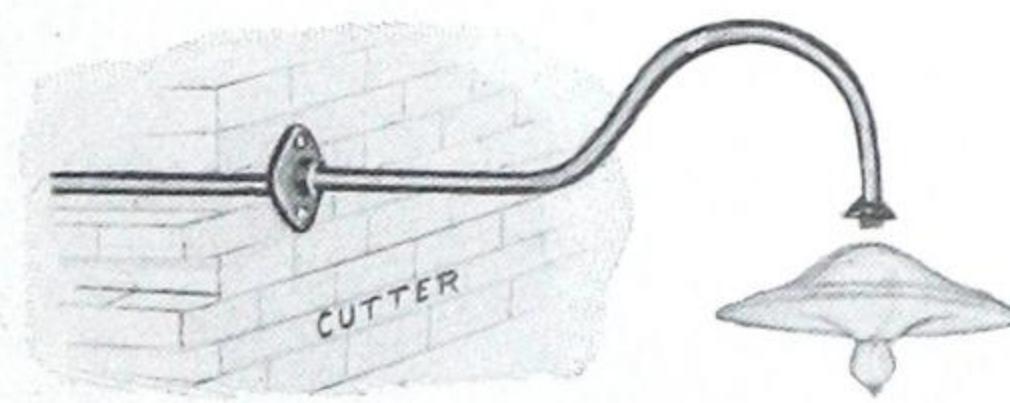
Inner-Wired Bracket



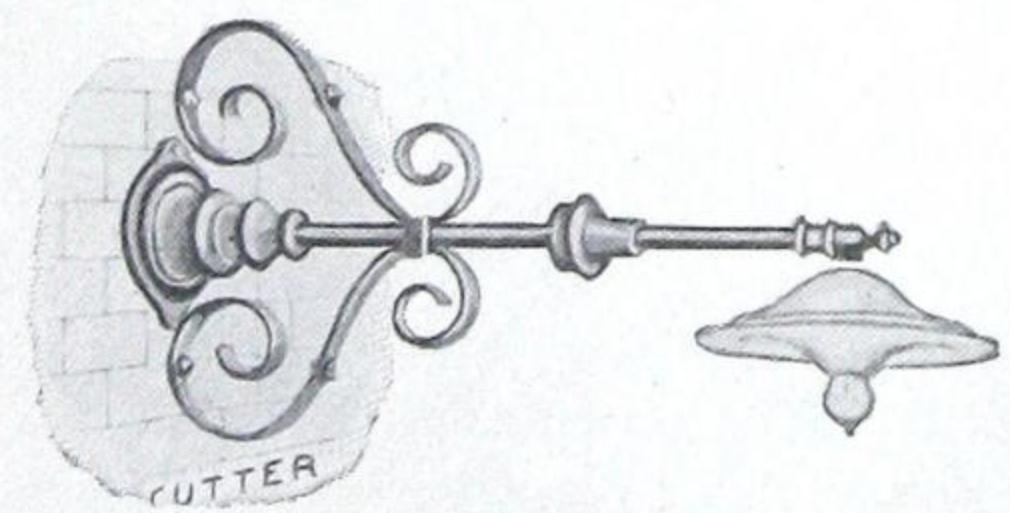
Majestic Junior Bracket



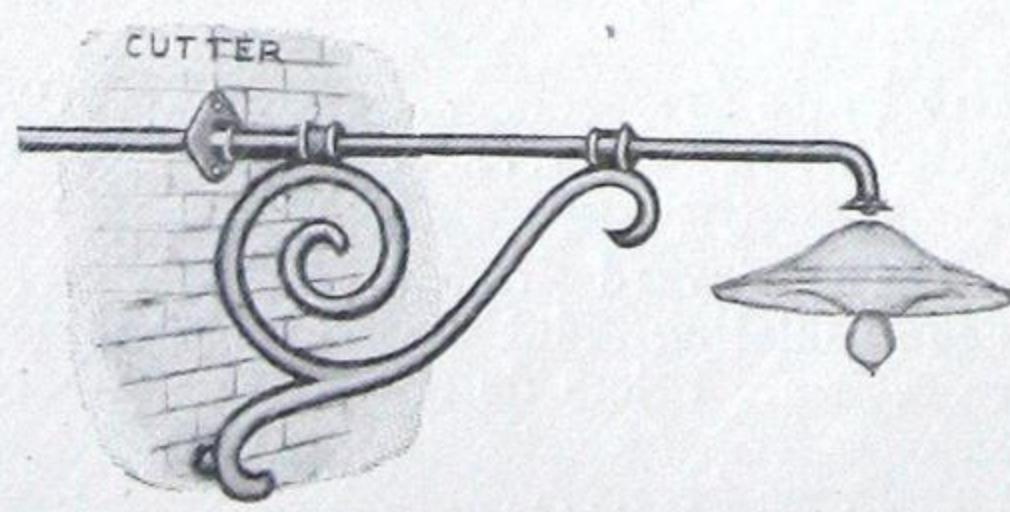
Spartan Junior Bracket



Wall Bracket



Corinthian Bracket



Entrance Bracket

### INNER-WIRED BRACKETS

Consists of a 3-foot gooseneck of  $\frac{1}{2}$ -inch pipe,  $\frac{1}{2}$ -inch by  $\frac{3}{4}$ -inch hood flange, and grooved pole plate.

Trade No.	Description	Wt. Lbs.	Price Each
21941	With Brace Arm.....	8 $\frac{1}{2}$	\$1.50
21942	Without Brace Arm.....	5 $\frac{1}{2}$	.95

### MAJESTIC JUNIOR BRACKETS

A highly artistic fixture built on the same lines as Majestic Bracket (Trade No. 21525) but smaller, having a reach of 3 feet from pole to lamp and with the arm made of  $\frac{1}{2}$ -inch pipe. Designed for either inner or outer wiring.\*

21943	With Hood Flange.....	15 $\frac{1}{4}$	2.75
21944*	Without Hood Flange....	15	2.60

### SPARTAN JUNIOR BRACKETS

A single bend bracket of  $\frac{1}{2}$ -inch pipe which holds the lamp 3 feet from the pole. Designed for either inner or outer wiring.\*

21945	With Hood Flange.....	13 $\frac{1}{4}$	2.45
21946*	Without Hood Flange....	12	2.30

### WALL BRACKETS

Has a 4-foot gooseneck of  $\frac{1}{2}$ -inch pipe so the pipe can extend 1 foot inside the flange and hold the lamp 3 feet from the wall. Furnished with wall flange and  $\frac{1}{2}$ -inch by  $\frac{3}{4}$ -inch hood flange.

21947	.....	6 $\frac{1}{4}$	1.10
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### CORINTHIAN BRACKETS

A 3-foot bracket of  $\frac{3}{4}$ -inch pipe with heavy wall plate and wrought iron trimmings. The headpiece is threaded for  $\frac{3}{4}$ -inch nipple and has a flange to fit the top of the streethood body.

21948	.....	19 $\frac{1}{2}$	3.35
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### ENTRANCE BRACKETS

Has a 4-foot gooseneck of  $\frac{3}{4}$ -inch pipe and a wall flange with set screw, which allows the pipe to extend 1 foot inside the flange and 3 feet outside. Furnished with cast iron scroll and hood flange to fit streethood bodies. This bracket may be used with all Cutter Streethood Bodies having fittings for  $\frac{3}{4}$ -inch pipe. Furnished with hood flange or plain threaded end for Radial Streethood Bodies with  $\frac{3}{4}$ -inch canopies.

21949	With Hood Flange.....	25	3.70
21950	Without Hood Flange....	23 $\frac{1}{2}$	3.55

### CAST SCROLL BRACKETS

Similar to the Entrance Bracket, but with a 4-foot gooseneck of  $\frac{3}{4}$ -inch pipe (Style B, Trade No. 21443) and with a grooved wall plate to replace the wall flange and inside pipe. This allows the wires to be brought out of the building at any desired point and guided along the wall to the place where the fixture is located. Furnished with hood flange for Inverted Cone Streethood Bodies or with plain threaded end for  $\frac{3}{4}$ -inch streethood canopies.

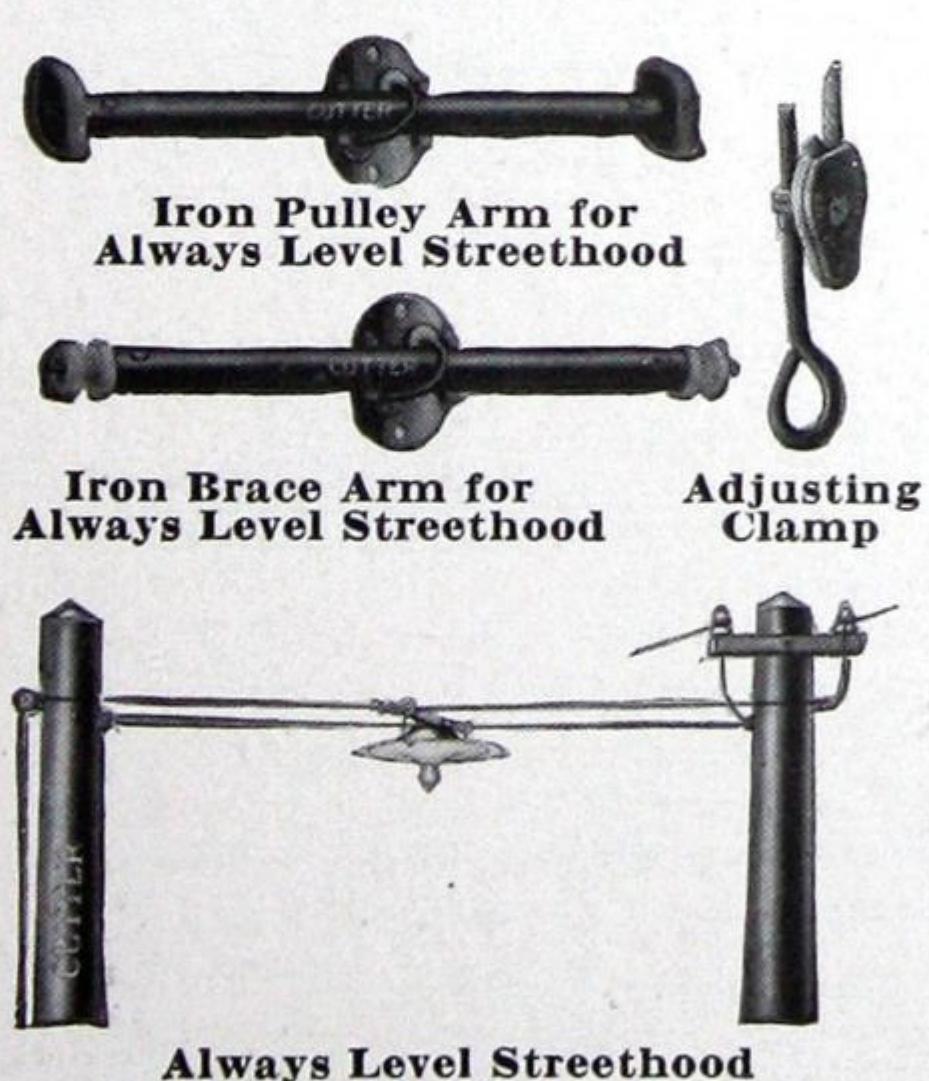
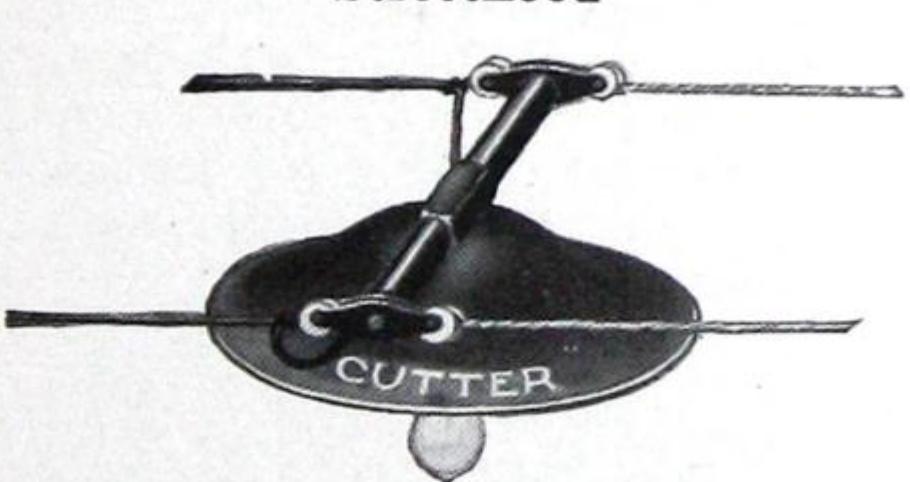
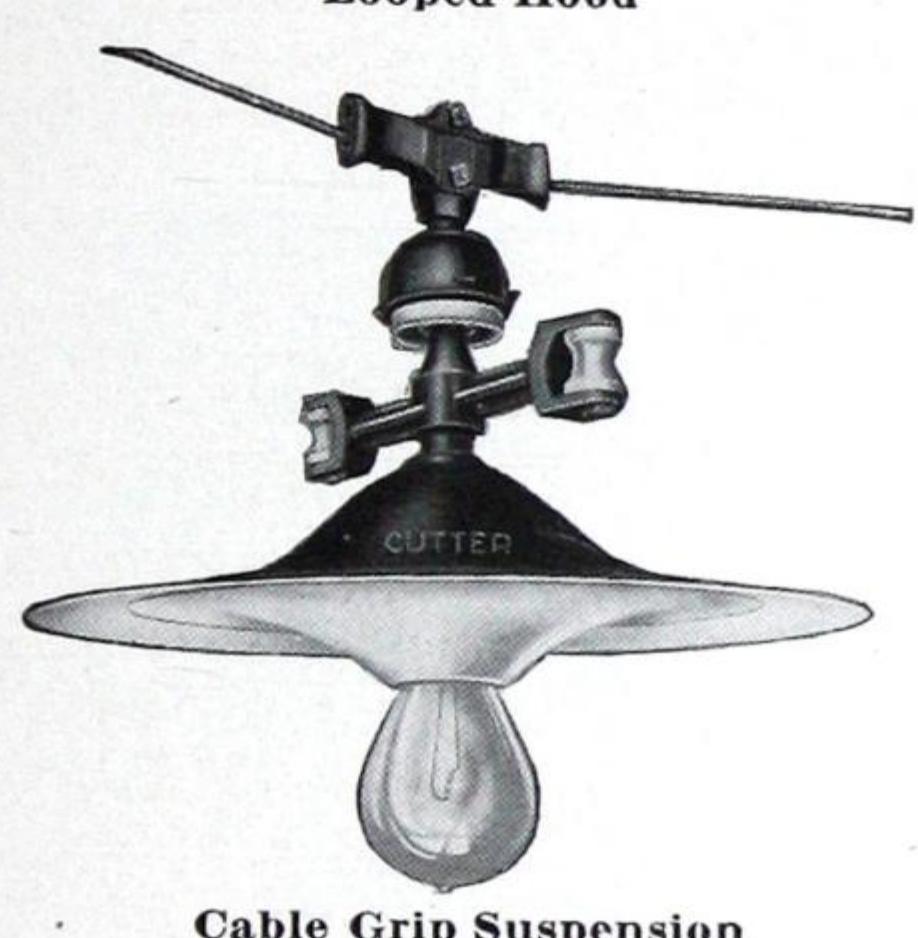
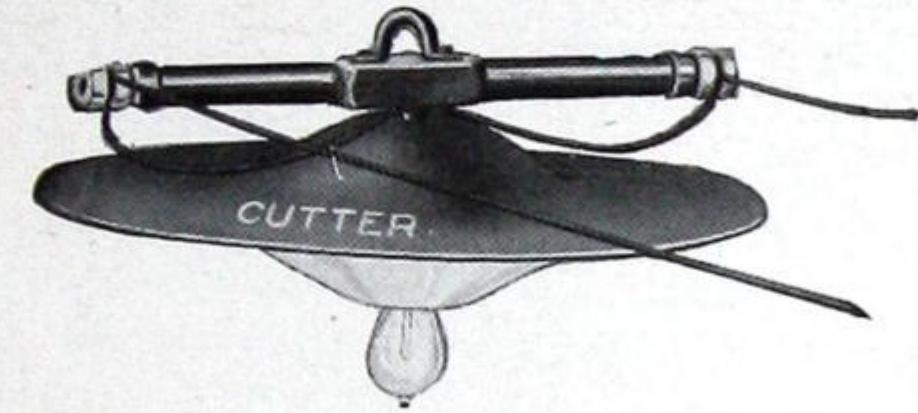
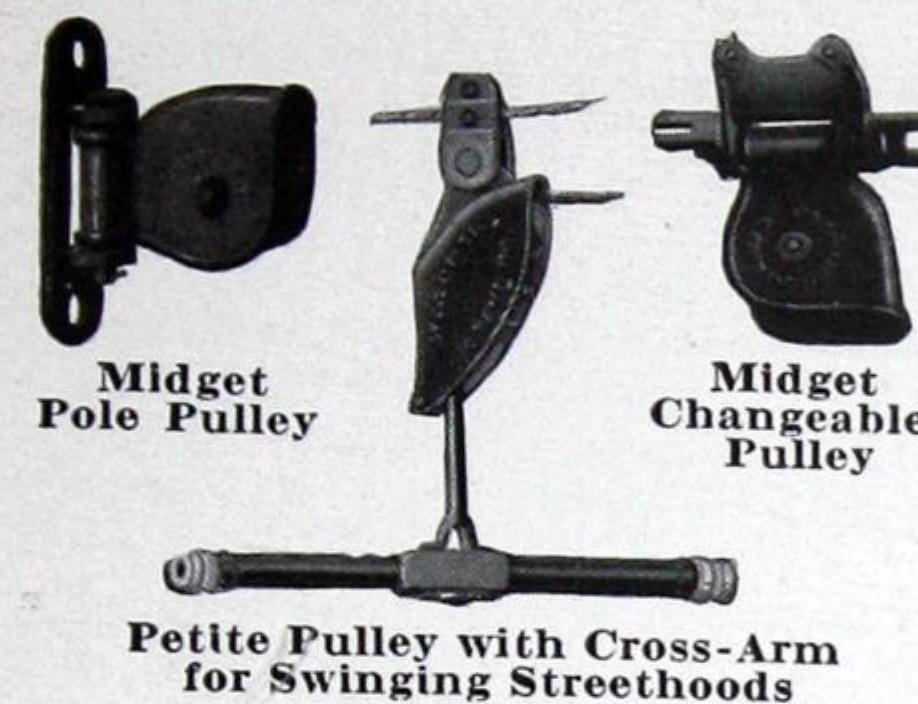
21987	With Hood Flange.....	24	3.45
21988	Without Hood Flange....	22 $\frac{1}{2}$	3.30

\* Majestic and Spartan Junior Brackets will be furnished with grooved pole plates unless otherwise specified. For outer-wired fixtures, order Standard Cross-Arm No. 21496 or Iron Cross-Arm No. 21497 in place of hood flange. For outer-wired brackets on series circuits, order  $\frac{1}{2}$ -inch Hood Insulator No. 21494 to separate gooseneck from cross-arm.

## CUTTER CENTER SUSPENSION STREETHOODS

WITH INVERTED CONE STREETHOOD BODIES

Schedule A—Standard Package Quantity, 20 of One Style or Trade Number



## SWINGING STREETHOODS

Consists of a Cutter Inverted Cone Streethood Body supported by a Petite Lamp-Supporting Pulley. A Midget Pole Pulley guides the hoisting rope to the bottom of the pole. The Midget Changeable Pulley may be used either as a pole pulley or clamped to cable near the pole. Order pulleys and Inverted Cone Streethood Bodies separately.

Trade No.	Description	Std. Pkg.‡	Wt., Lbs. Each	Price Each
20413	Petite Pulley with Cross-Arm	50	6½	\$1.50
20414	Midget Pole Pulley.....	100	2½	.60
20415	Midget Changeable Pulley..	100	2½	.70

## LOOPEO HOODS

Consists of an Inverted Cone Streethood Body with Looped Cross-Arm.

## With 18-inch Hood, Paint Enamelled

Trade No.	Medium Screw Skt.	Mogul Screw Skt.	*Regent Film Skt.	Trade No.	Wt., Lbs. Each	Price Each		
21951	8½	\$2.40	21952	8¾	\$2.70	21953	9	\$3.70
21954	9¾	3.90	21955	10	4.20	21956	10½	5.20
21957	10¾	3.00	21958	11	3.30	21959	11½	4.30
21960	12¾	4.70	21961	13	5.00	21962	13½	6.00

## CABLE GRIP SUSPENSION STREETHOODS

A center span fixture with a cross-arm, insulator and cable clamp supporting Inverted Cone Streethood Bodies.

## With 18-inch Hood, Paint Enamelled

21963	14	4.00	21964	14½	4.30	21965	14½	5.30
21966	15½	5.50	21967	15½	5.80	21968	15¾	6.80
21969	16½	4.60	21970	16½	4.90	21971	17	5.90
21972	18½	6.30	21973	18½	6.60	21974	19	7.60

## ALWAYS LEVEL STREETHOODS

The two wires leading from the brace arm to the hood make up one side of the suspension, while cords passing over covered pulleys form the other side. Adjusting clamps at the end of each cord are independently drawn up taut and locked together. These parts, together with the Center Hoods listed below, constitute Always Level Streethoods. Prices do not include rope, lamps or wires.

## EXTRA PARTS FOR ALWAYS LEVEL STREETHOODS

Trade No.	Description	Std. Pkg.‡	Wt., Lbs. Each	Price Each
20399	Iron Pulley Arm.....	75	6	\$1.40
20400	Iron Brace Arm.....	75	6	1.20
20401	Adjusting Clamp.....	200	½	.30

## CENTER HOODS

The center part only of the Cutter Always Level Streethood described above. It consists of a spreader tip cross-arm and an Inverted Cone Streethood Body.

## With 18-inch Hood, Paint Enamelled

Trade No.	Medium Screw Skt.	Mogul Screw Skt.	*Regent Film Skt.	Trade No.	Wt., Lbs. Each	Price Each		
21975	11	\$2.80	21976	11½	\$3.10	21977	11½	\$4.10

## With 18-inch Hood, Porcelain Enamelled

21978	12½	4.30	21979	12½	4.60	21980	13	5.60
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## With 22-inch Hood, Paint Enamelled

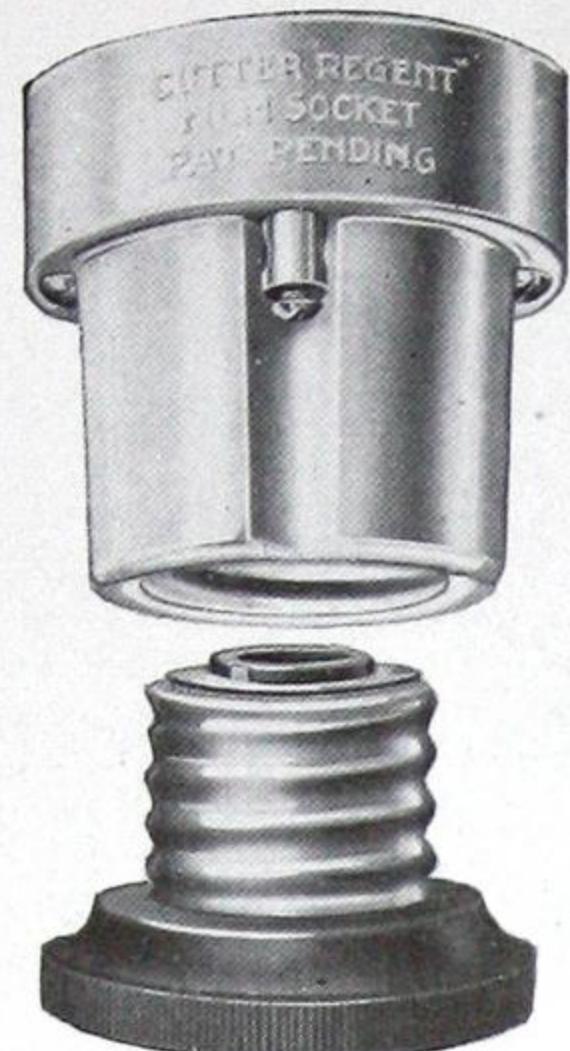
21981	13½	3.40	21982	13¾	3.70	21983	14	4.70
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## With 22-inch Hood, Porcelain Enamelled

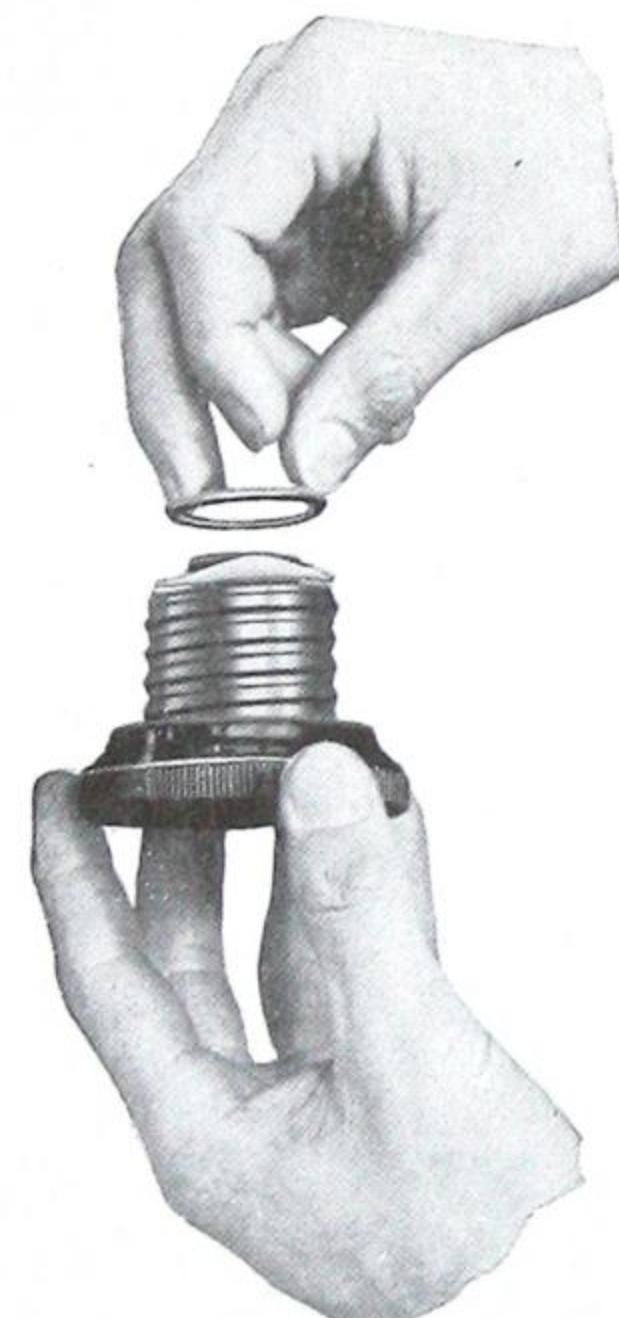
21984	16½	5.10	21985	16¾	5.40	21986	17	6.40
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† Extra parts ordered to make complete fixtures, take same discounts as complete fixtures.

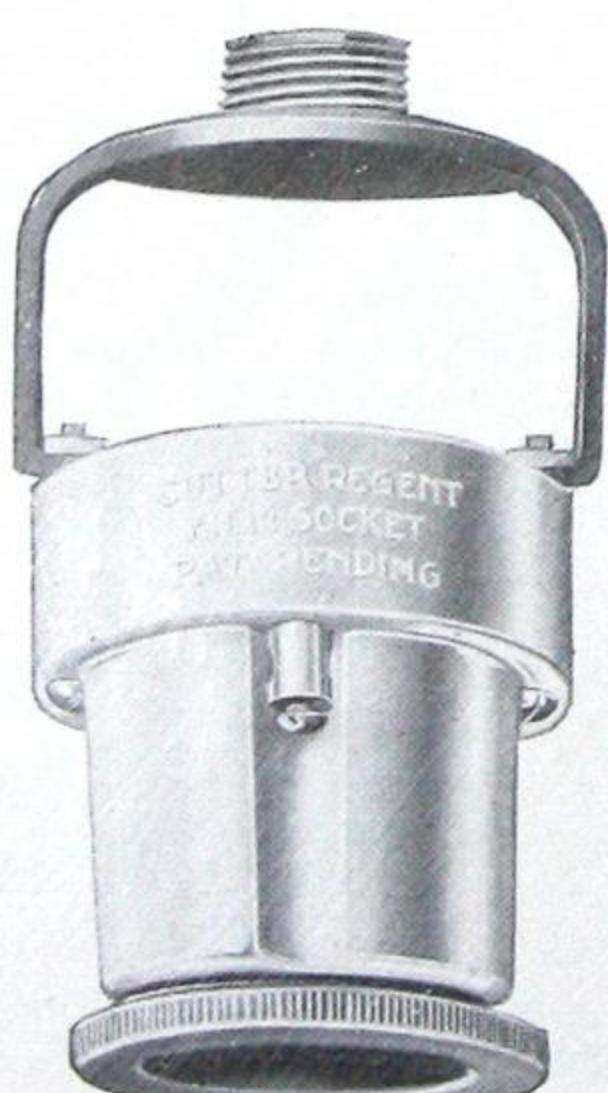
\* Standard Film Sockets furnished in place of Regent when so ordered.



Regent Receptacle and  
Mogul Base Socket with  
Film Holder



Showing Ease with which  
Films are Removed



Regent Film Socket  
No. 21467 Complete

## CUTTER REGENT FILM SOCKETS

### THE SAFETY VALVE FOR STREET SERIES SYSTEMS

#### Schedule A

The film socket is the vital part of the regulating mechanism of a series lighting system, and it must constantly perform its function reliably and accurately. When one lamp in a circuit burns out, the dielectric film must puncture, allowing the circuit to re-establish itself instantly. Otherwise, the remaining lamps in the circuit will cease to burn. The constant current transformer regulates the voltage to compensate for burned-out lamps, but as each lamp burns out there is a momentary rise of potential across the terminals of that lamp. If the dielectric strength of the film be too great, the rise of voltage may not be sufficient to puncture the film at all, or until such time as will permit ill effects to be produced along the line and in auxiliary apparatus. On the other hand, if the film is weak, it may break down before the useful life of the lamp is secured. The film socket is the safety valve and much depends upon its reliability.

The film cut-out used in the Regent Film Socket punctures uniformly and accurately at rated voltage. It is enclosed in the socket and protected against climatic conditions. It cannot creep or fall out as a result of the vibration of the fixture and lamp in service.

The film holder is so designed that it is impossible to use any substitute in place of the regular film. Wood splinters, paper, etc., cannot be used. Films are easily renewed.

On account of wind action and changing climatic conditions, the spring clips commonly used to support the socket and lamp deteriorate and allow the lamp to fall out—there are no spring clips used in the Regent Socket.

The two screw shells and the center post form a combination that grips the lamp base and holds it securely in position, greatly reducing lamp breakage during inclement weather.

When renewing lamps, the film is placed in the film holder. The lower socket shell is then screwed in as far as it will go easily, then given an extra half turn which locks it. The lamp is then screwed into the lower shell in the same manner.

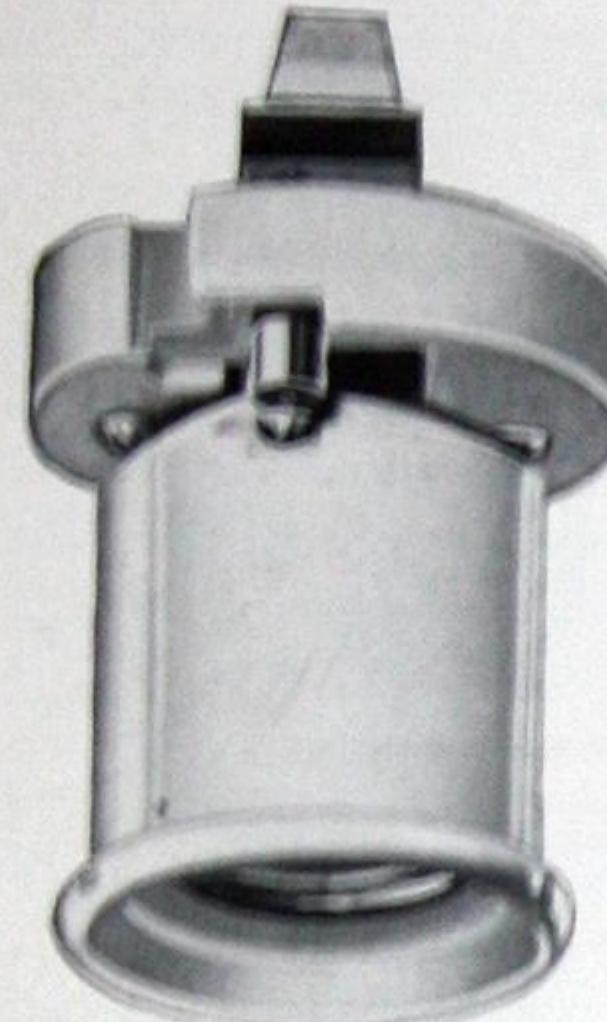
The Regent Film Socket is only  $3\frac{1}{2}$  inches over all, and due to the fact that all contacts and live parts are covered by the porcelain, the socket can be mounted in a very small space. The distance between supporting screws and nearest live terminal is  $1\frac{1}{2}$  inches. There are no live metal parts exposed back of the socket. Corrosion and danger of short circuits are eliminated.

Porcelain housings furnished with streethood bodies listed without socket are supplied with screws and nuts for supporting Regent Film Socket No. 21466. This socket is listed also with hood fork and  $\frac{3}{4}$ -inch rigid male nipple for making combination fixtures of the inverted cone type, and with other fittings for mounting in old style fixtures previously installed. Three films furnished free with each socket.

Trade No.	Description	Ship. Pkg.	Wt., Lbs. Each	Price Each
21466	Receptacle, Mogul Base Socket and film holder.....	50	1 $\frac{1}{2}$	\$1.80
21467	Same, with $\frac{3}{4}$ -inch hood fork, rigid male nipple.....	50	1 $\frac{3}{4}$	2.00
21468	Same, with $\frac{3}{4}$ -inch hood fork, female thread.....	50	1 $\frac{7}{8}$	2.00
21469	Same, with $\frac{3}{8}$ -inch hood fork, female thread.....	50	1 $\frac{3}{4}$	2.00
21481	Same, with $\frac{3}{8}$ -inch low flange, female thread.....	50	1 $\frac{5}{8}$	2.00
21482	Lamp socket only, with film holder.	50	$\frac{1}{4}$	.40
21483	Package of 50 silk films.....	500 films		.75

## CUTTER STREETHOOD SOCKETS

### FOR STREET SERIES AND MULTIPLE LAMPS



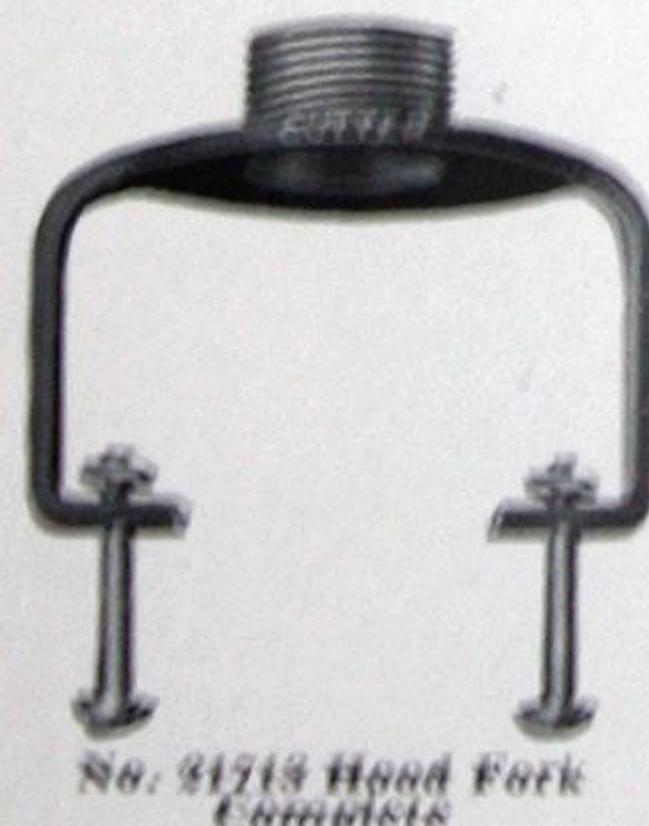
Standard Film Receptacle  
and Mogul Base  
Socket



Reactance Socket



Medium Screw Base  
Lamp Grip Socket



No. 21713 Hood Fork  
Complete

#### Schedule A

#### STANDARD FILM SOCKETS

Have a porcelain receptacle with wire terminals and spring clips to hold the projecting fingers of the socket part. These fingers hold the dielectric film. The receptacle fits in the porcelain housing of Cutter Radial Streethood Bodies listed on pages 4 and 5. Screws and nuts for holding the receptacle in place are included with the streethood bodies and with the hood forks furnished with Inverted Cone Streethood Bodies.

Trade No.	Description	Std. Pkg.	Wt. Each	Price Each
21462	Receptacle and socket, Mogul Screw Base	50	1 1/4	\$1.80
21434	Receptacle only.....	100	1 1/2	.80
20480	Socket part only, Mogul Screw Base.....	75	3/4	1.00
20481	Socket part only, medium screw base.....	100	1 1/2	.50
21451	Package of 15 films.....	500 films		.30

#### REACTANCE SOCKETS

Consist of Cutter Mogul Screw Base Streethood Socket with special hood fork supporting a reactance coil connected in shunt with the lamp. These sockets are for use on series lighting systems, and when a lamp fails, the reactance coil compensates for the voltage drop through the lamp, thus maintaining constant current without the use of a regulator. In ordering, state voltage and amperes of circuit and voltage and candle power rating of lamp. Designed only for use with Cutter Inverted Cone Streethood Bodies. Furnished with 3/4-inch Male Nipple.

Trade No.	Candle Power Lamp	Std. Pkg.	Wt. Each	Price Each
8.5 or 4 Amps. 60 Cycles	8.8 Amps. 60 Cycles			
20487	20491	25	4	\$5.30
20488	20492	25	5	5.50
20489	20493	25	6	5.65
20490	20494	25	7	6.00

#### LAMP GRIP MULTIPLE SOCKETS

Cutter Lamp Grip Sockets are designed to meet the severe conditions found in outside service. The intense heat of the Type C lamps subjects the socket to greatly varying temperatures, ranging from several hundred degrees Fahr. when the lamp is burning, to below zero when the lamp is out.

These changes in temperature, taking place while the socket shells are under tension, will quickly depreciate their spring qualities and cause them to split, unless they are made sufficiently strong and some provision provided to meet these conditions.

The Cutter Lamp Grip Sockets are equipped with two vertical springs which engage the threads of the lamp collar, reinforce the socket shells and relieve the tension. These vertical springs grip the lamp base and prevent the lamp from working loose when subjected to vibration and the contraction and expansion caused by the variations in temperature.

These springs also create an increase of positive contact between the lamp terminal and the socket.

The terminals are easily accessible and very generously designed.

The use of these sockets will greatly reduce lamp breakage and outages.

Trade No.	Description	Std. Pkg.	Wt. Each	Price Each
21400	Medium Screw Base.....	200	1 1/2	\$0.50
21402	Mogul Screw Base.....	150	1 1/4	.80

#### HOOD FORKS AND FLANGES

With screws and nuts for fastening sockets in Cutter Inverted Cone Streethood Bodies.

21713	Hood fork with 3/4-inch rigid male nipple.....	100	3/8	.20
21484	Hood fork with 3/4-inch female thread	100	1 1/2	.20
21485	Hood fork with 3/8-inch female thread	100	1 1/2	.20
21486	Low flange with 3/8-inch female thread	100	1 1/4	.20

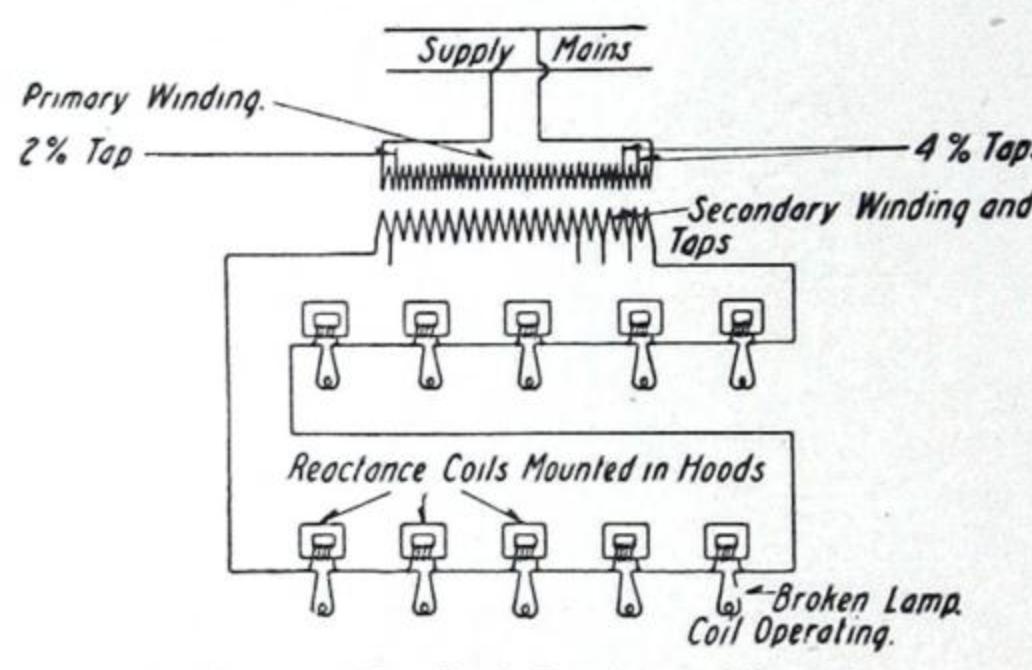
## ADJUSTER-SOCKET SYSTEM

The adjuster-socket system operates only on constant-potential circuits. It consists of a simple series of lamps connected across constant-potential alternating-current mains, or across the secondary terminals of a constant-potential transformer. A reactance coil is connected in shunt across the terminals of each lamp and operates in a well-known manner to maintain the continuity and normal voltage of the circuit in case of burnouts or lamp removals.

**REACTANCE COIL**—The reactance coil is one of the simplest and most economical devices ever developed for maintaining the continuity of a lamp circuit. It has an effective reactance voltage equivalent to the voltage of a burning lamp, but the loss of energy sustained by its use is only about 4 or 5 per cent of that taken by a lamp. Taking this loss into consideration, the adjuster-socket system has an efficiency of 95 or 96 per cent with all lamps burning. The coils are so designed that lamps of increased efficiency can be used without change. The drop created by the coil when a lamp is out is such that the current is not greatly altered until about 20 per cent of the lamps on the circuit are out. Lamps of larger candle-power may be used with the standard reactance coils so long as the voltage per lamp does not greatly exceed the voltage of the lamp for which the coil is listed.



Transformer for Adjuster  
Socket System



Adjuster Socket System Showing  
Operation of Reactance Coils  
to Replace Lamps

**MAXIMUM NUMBER OF LAMPS**—Since the lamps are operated in series from a constant-potential source of supply, all the lamps in one circuit must be of the same ampere capacity, though not necessarily of the same candle-power. The sum of the lamp voltages should equal the supply voltage. Consequently, it is necessary to use a definite number of lamps on a given supply voltage.

**FLEXIBILITY**—With the adjuster-socket system, a great flexibility is possible through the use of standard transformers which are listed on page 6. These provide several different ranges of voltages for lamp circuits. Where the supply circuit voltage differs from that for which the standard apparatus is listed, or where the number of lamps would be better served by a different range of voltages, special transformers adapted to the existing conditions, can be furnished on order.

**TRANSFORMERS**—On supply circuits up to 550 volts, it is possible to connect the lamps in series with a control switch, directly across the mains. On higher voltages, however, the supply mains should ordinarily be properly insulated from the lamp circuits by means of suitable transformers. Transformers for this purpose are regularly furnished for 2200-volt supply circuits. Standard transformers are designed to feed one circuit of lamps. All transformers are provided with weatherproof cast-iron cases suitable for indoor use, or for outdoor mounting on poles at a distance from the power station, at any advantageous point.

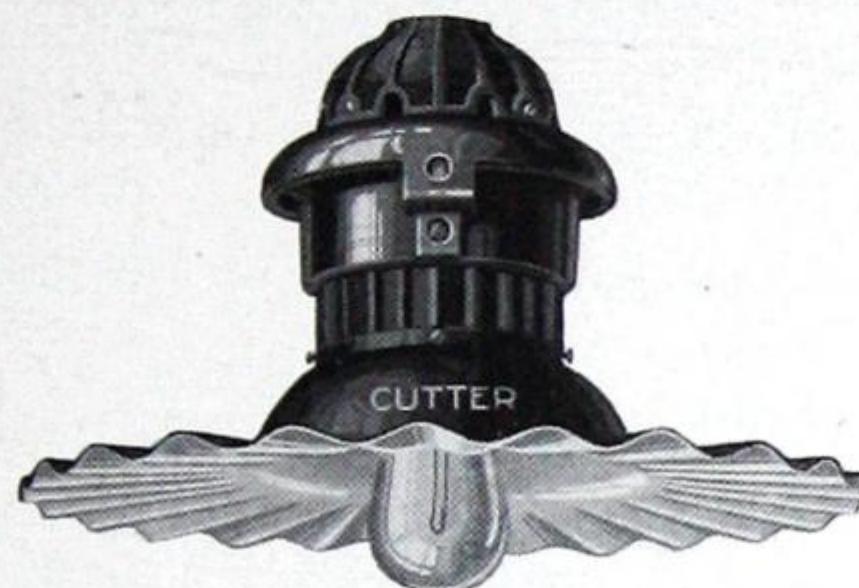
**VOLTAGE VARIATIONS**—Taps are provided in the primary winding by means of which any secondary voltage may be raised 2, 4, 6, 8, or 10 per cent if operating on a 2200-volt circuit. By this arrangement any voltage within one per cent of that required by the circuit may be obtained. All taps on both windings are brought to terminal blocks, inside the transformer case. No soldered connections need to be changed in adjusting taps.

## CUTTER ADJUSTER SOCKET STREETHOOD BODIES

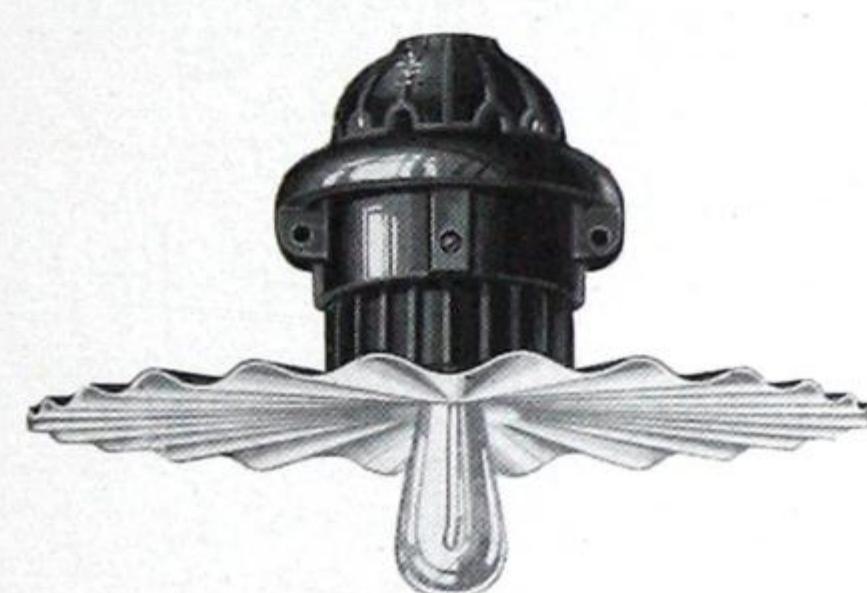
For 60, 80 and 100 C. P. 6.6 Ampere, 60 Cycle Series Mazda "C" Lamps.

Schedule A—Standard Package Quantity, 20 of one Style or Trade Number.

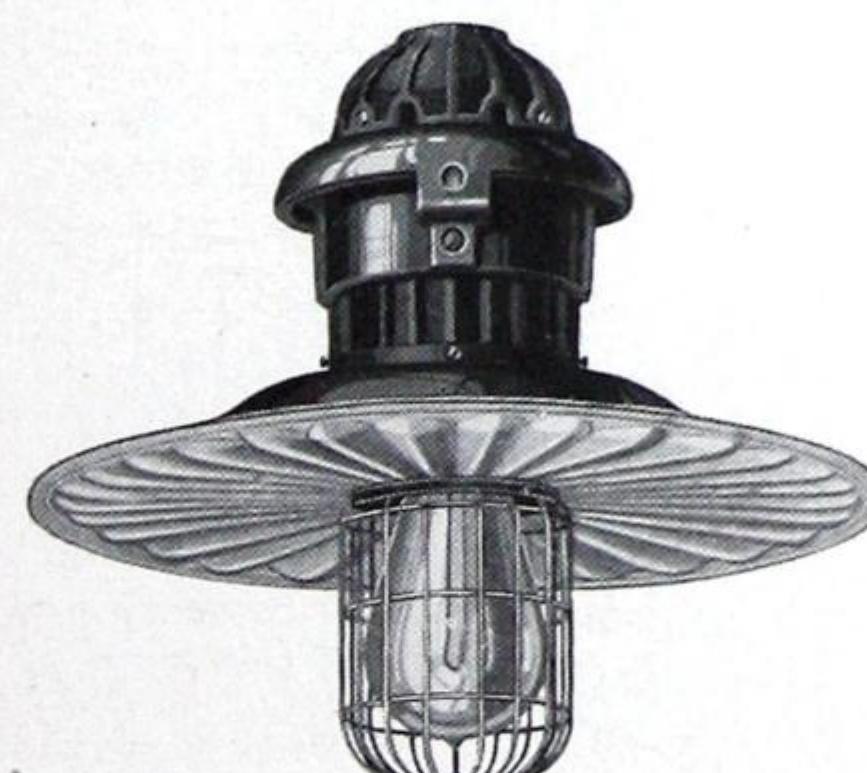
An Adjuster Socket Streethood Body consists of a ventilated iron canopy threaded for  $\frac{3}{4}$ -inch pipe or adapter or for 1 $\frac{1}{4}$ -inch pipe; a porcelain housing with cast iron reflector holder reactance (adjuster) coil connected to Cutter Mogul Base Lamp Grip Socket and with Porcelain enameled reflector as listed. Reflectors are designed for correct light distribution with type "C" lamps and are equipped with standard 4-inch copper heels to prevent chipping of the enamel. The Porcelain Housing is made for use on either inner-wired or outer-wired fixtures. The line wires on outer-wired fixtures may be tied in the projections on the sides of the Porcelain Housing, thus eliminating the necessity of a cross-arm. Prices below include everything shown except the lamps. Bracket and center suspension fittings are listed separately on other pages.



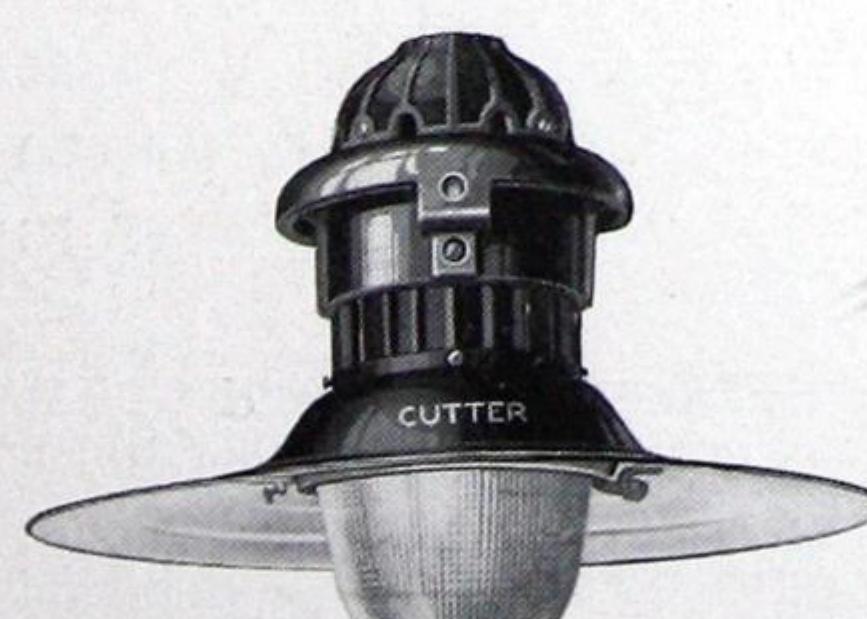
18-inch Radial Bowl Streethood Body



20-inch Flat Radial Streethood Body



18-inch Two Piece Radial Streethood Body with Lamp Guard



18-inch Concentric Dome Streethood with Small Holophane Refractor

### With 18-inch Radial Bowl Reflector

Trade No.	For $\frac{3}{4}$ " Pipe	For 1 $\frac{1}{4}$ " Pipe	Description	Ship. Wt. Lbs	List Price
22373	22374	For 60 c.p. lamp	18	\$14.00	
22375	22376	For 80 c.p. lamp	19	15.10	
22377	22378	For 100 c.p. lamp	22	15.10	

### With 20-inch Radial Bowl Reflector

18-inch Radial Bowl Streethood Body	22379	22380	For 60 c.p. lamp	19	14.50
	22381	22382	For 80 c.p. lamp	20	15.60
	22383	22384	For 100 c.p. lamp	23	15.60

### With 20-inch Flat Radial Reflector

20-inch Flat Radial Streethood Body	22385	22386	For 60 c.p. lamp	16 $\frac{1}{2}$	13.30
	22387	22388	For 80 c.p. lamp	17 $\frac{1}{2}$	14.40
	22389	22390	For 100 c.p. lamp	20 $\frac{1}{2}$	14.40

### With 18-inch Two-Piece Radial Hood with Lamp Guard

18-inch Two Piece Radial Streethood Body with Lamp Guard	22391	22392	For 60 c.p. lamp	22	16.00
	22393	22394	For 80 c.p. lamp	23	17.10
	22395	22396	For 100 c.p. lamp	26	17.10

Deduct for Lamp Guard. . . . . \$1.00

### With 18-inch Concentric Dome Reflector and Small Holophane Refractor

18-inch Concentric Dome Streethood with Small Holophane Refractor	22397	22398	For 60 c.p. lamp	21	17.30
	22399	22412	For 80 c.p. lamp	22	18.40
	22413	22414	For 100 c.p. lamp	25	18.40

### With 18-inch Concentric Dome Reflector and Small Band Refractor

18-inch Concentric Dome Streethood with Small Band Refractor	22417	22418	For 60 c.p. lamp	20 $\frac{1}{2}$	17.05
	22419	22424	For 80 c.p. lamp	21 $\frac{1}{2}$	18.15
	22425	22426	For 100 c.p. lamp	24 $\frac{1}{2}$	18.15

### With 18-inch Concentric Dome Reflector and Small Opal Diffuser

18-inch Concentric Dome Streethood with Small Opal Diffuser	22455	22456	For 60 c.p. lamp	19	14.80
	22457	22458	For 80 c.p. lamp	20	15.90
	22459	22460	For 100 c.p. lamp	23	15.90

## CUTTER ADJUSTER SOCKET STREETHOOD BODIES

For 60, 80 and 100 C. P. 6.6 Ampere, 25 Cycle Lamps.

Schedule A—Standard Package Quantity, 20 of one Style or Trade Number.

The Adjuster Socket Streethood Bodies listed on this page have reactance coils of the 25-cycle type. Otherwise, they are exactly the same as those listed on previous page.

## PRICE LIST 25 CYCLE ADJUSTER STREETHOOD BODIES



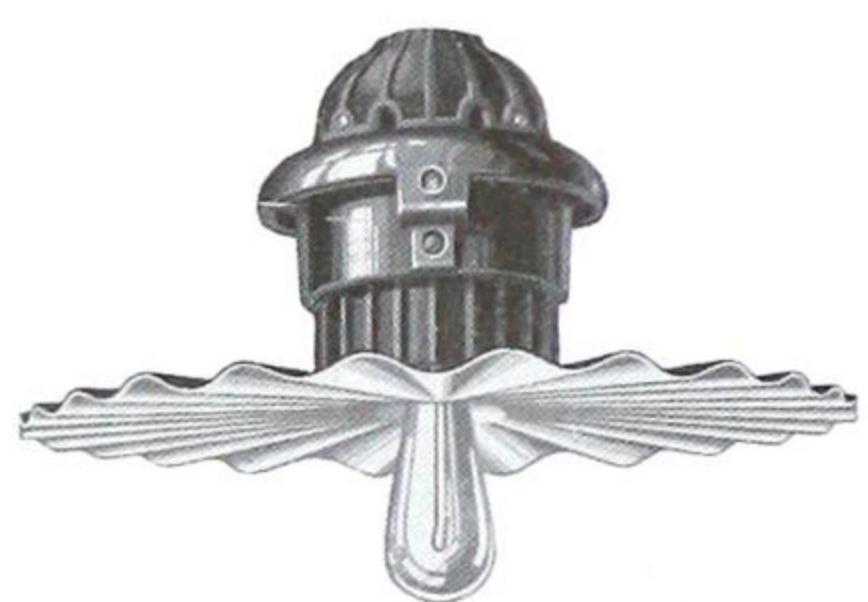
18-inch Radial Bowl Streethood Body 22509

## With 18-inch Radial Bowl Reflector

Trade No. For $\frac{3}{4}$ " Pipe	Trade No. For $\frac{1}{4}$ " Pipe	Description	Ship. Wt. Lbs. Each	List Price
22501	22502	For 60 c.p. lamp	18	\$15.25
22503	22504	For 80 c.p. lamp	19	16.50
22507	22508	For 100 c.p. lamp	22	16.50

## With 20-inch Radial Bowl Reflector

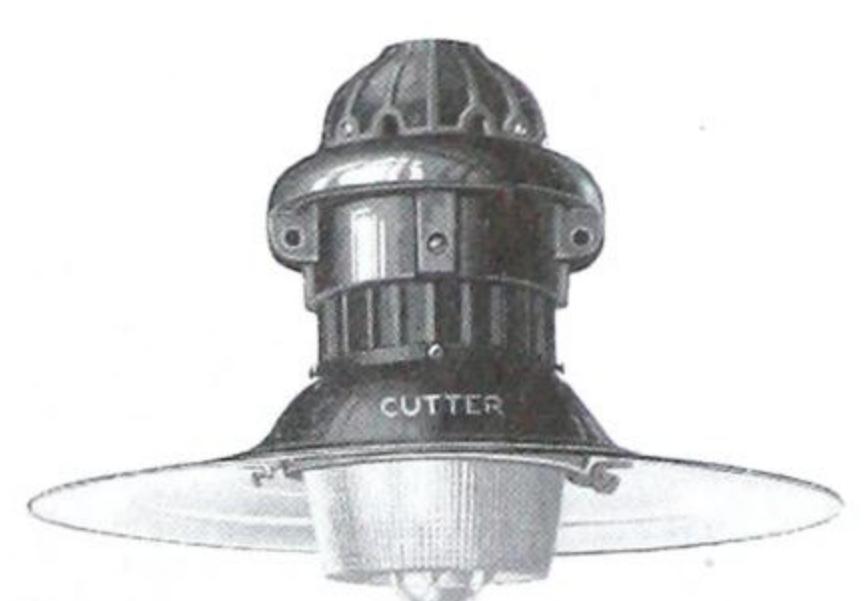
22510	For 60 c.p. lamp	19	15.75	
22511	22512	For 80 c.p. lamp	20	17.00
22517	22518	For 100 c.p. lamp	23	17.00



20-inch Flat Radial Streethood Body

## With 20-inch Flat Radial Reflector

22519	22520	For 60 c.p. lamp	16 $\frac{1}{2}$	14.50
22521	22522	For 80 c.p. lamp	17 $\frac{1}{2}$	15.75
22523	22524	For 100 c.p. lamp	20 $\frac{1}{2}$	15.75



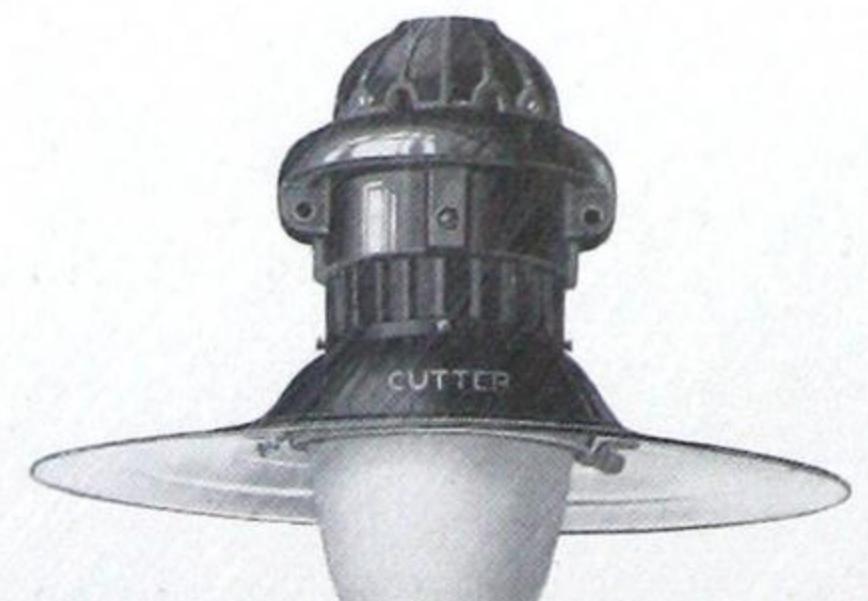
18-inch Concentric Dome Streethood Body with Small Band Refractor 22575

## With 18-inch Two-Piece Radial Reflector and Lamp Guard

22525	22528	For 60 c.p. lamp	22	17.25
22529	22532	For 80 c.p. lamp	23	18.50
22567	22568	For 100 c.p. lamp	26	18.50
Deduct for Lamp Guard.....				1.00

## With 18-inch Concentric Dome Reflector and Small Holophane Refractor

22569	22570	For 60 c.p. lamp	21	18.50
22571	22572	For 80 c.p. lamp	22	19.75
22575	22578	For 100 c.p. lamp	25	19.75



18-inch Concentric Dome Streethood Body with Small Opal Diffuser 22593

## With 18-inch Concentric Dome Reflector and Small Band Refractor

22581	22582	For 60 c.p. lamp	20 $\frac{1}{2}$	18.25
22583	22584	For 80 c.p. lamp	21 $\frac{1}{2}$	19.50
22585	22588	For 100 c.p. lamp	24 $\frac{1}{2}$	19.50

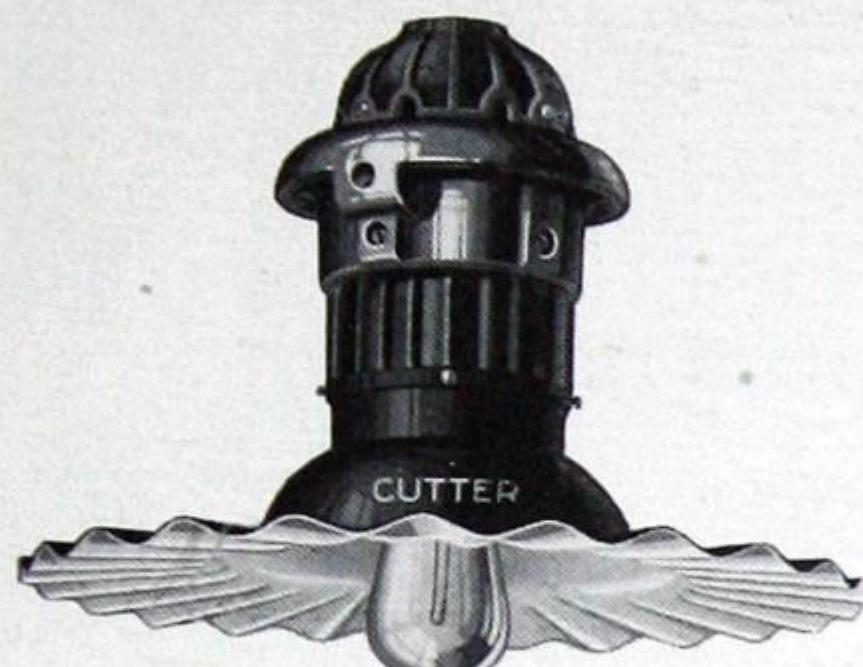
## With 18-inch Concentric Dome Reflector and Small Opal Diffuser

22589	22590	For 60 c.p. lamp	19	16.00
22591	22592	For 80 c.p. lamp	20	17.25
22593	22596	For 100 c.p. lamp	23	17.25

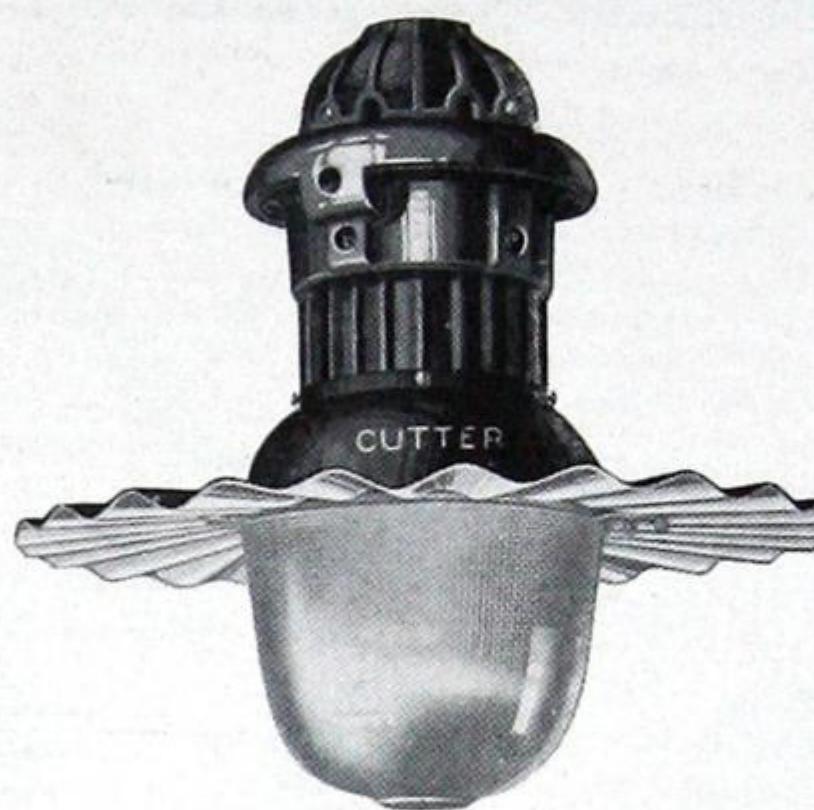
## CUTTER ADJUSTER SOCKET STREETHOOD BODIES

For 250 C. P. 6.6 Ampere, 60 Cycle Series Mazda Lamps.

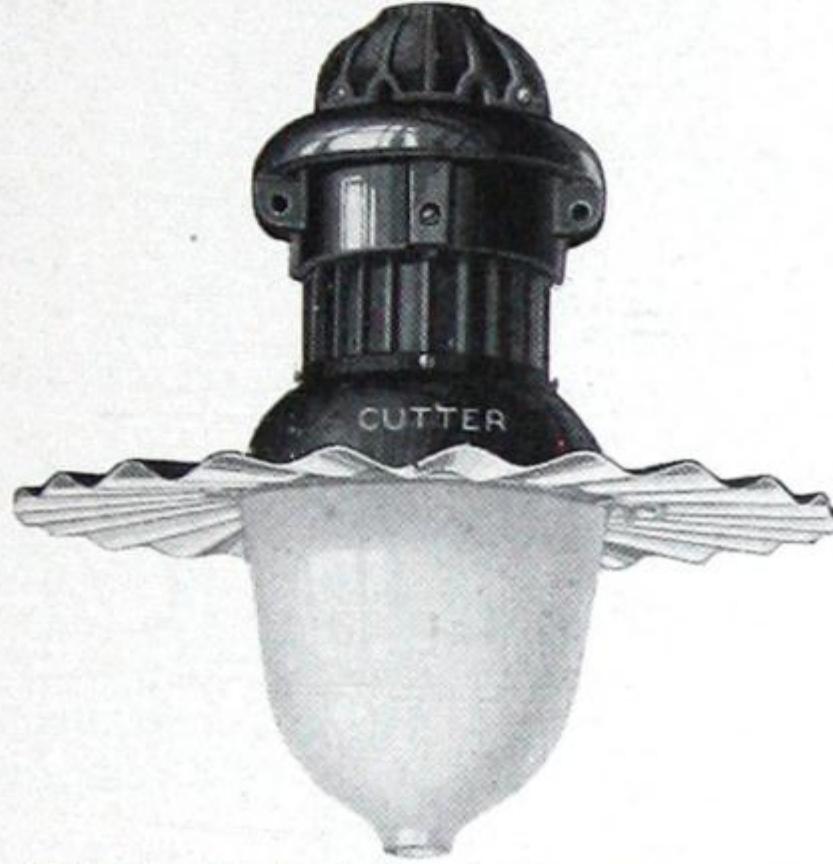
Schedule A—Standard Package Quantity, 20 of one Style or Trade Number.



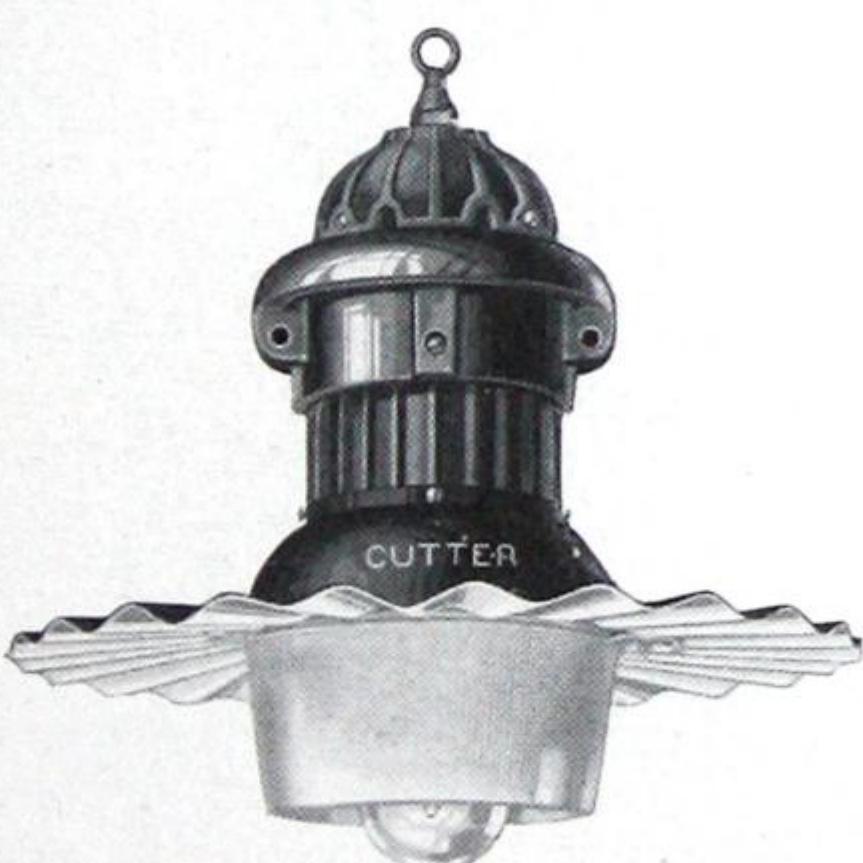
20-inch Radial Bowl Streethood Body with Extension



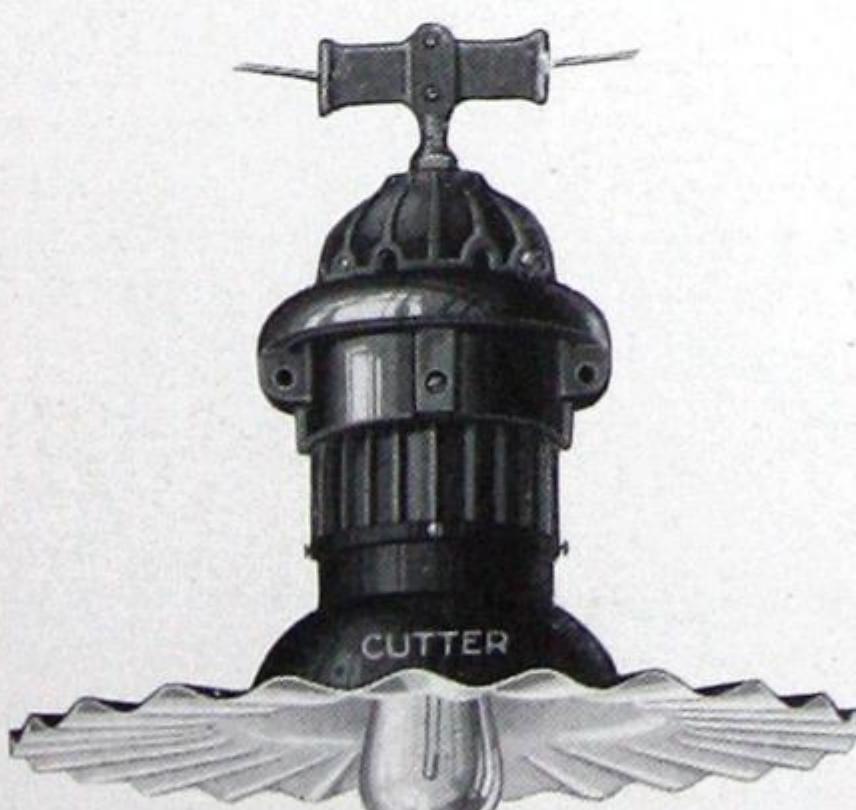
18-inch Radial Bowl Streethood Body with Large Bowl Refractor



8-inch Radial Bowl Streethood Body with Large Sol-lux Diffuser



Style D Streethood Body with 18-inch Radial Bowl Reflector and Large Band Refractor



Style F Streethood Body with 20-inch Radial Bowl Reflector with Extension Other styles of suspension as listed on pages 6 and 8 may be used by the addition of the parts described on those pages.

Adjuster Socket Streethood Bodies illustrated and listed on this page are similar to those listed on the previous pages. The cast iron reflector support is made longer to bring the lamp filament center of the 250 c.p. lamp in proper position with respect to the reflector and glassware. Shipped complete as shown (less lamp) with canopy threaded for either  $\frac{3}{4}$ -inch or 1 $\frac{1}{4}$ -inch pipe, porcelain housing with projections for holding line wires, reactance (adjuster) coil with Cutter Mogul Base Lamp Grip Socket, Porcelain Enamaled Reflector with standard 4-inch copper heel and glassware as listed. For bare 250 c.p. lamp, order 20-inch Radial Bowl Reflector with Extension.

### PRICE LIST ADJUSTER SOCKET STREETHOOD BODIES For 6.6 Amp. 250 c.p. 60 Cycle Series Mazda Lamps

Trade No.—		Description	Ship. Wt. Lbs. Each	List Price
For $\frac{3}{4}$ " Pipe	For $\frac{1}{4}$ " Pipe			
22597	22598	With 20-inch Radial Bowl Reflector with Extension..	24	\$17.50
22599	22600	With 18-inch Radial Bowl Reflector and large Holophane Refractor.....	30	24.75
22657	22658	Same with Skirted Refractor	30	24.25
22659	22660	Same with Band Refractor..	28	24.25
22661	22662	Same with Sol-lux Diffuser..	26	19.25
22663	22664	With 20-inch Concentric Dome Reflector and Large Holophane Refractor.....	30 $\frac{1}{2}$	24.50
22665	22666	Same with Skirted Refractor	30 $\frac{1}{2}$	24.00
22667	22668	Same with Band Refractor..	28 $\frac{1}{2}$	24.00
22669	22676	Same with Sol-lux Diffuser..	26 $\frac{1}{2}$	19.00

### HOW TO ORDER COMPLETE ADJUSTER SOCKET STREETHOODS

When the size of lamp has been determined, select the type of reflector with or without glassware that will produce the results in illumination desired. Brackets for supporting streethood bodies are listed on another page. After selecting the Bracket, order the streethood body with a canopy corresponding to size of pipe in the bracket.

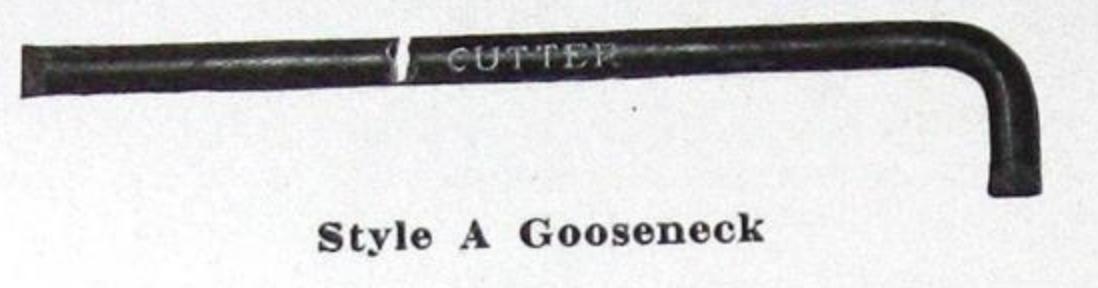
### CENTER SUSPENSION FIXTURES CONSIST OF STREETHOOD BODIES HAVING $\frac{3}{4}$ -INCH CANOPIES AND PARTS LISTED BELOW

#### Center Suspension Parts

Style D 20754 Arc Ring with stud.....	$\frac{1}{4}$	.10
20753 $\frac{3}{4}$ x $\frac{7}{16}$ -inch adapter.....	$\frac{1}{2}$	.15
Style F 20757 Cable Grip Clamps.....	$2\frac{1}{4}$	.50
20753 $\frac{3}{4}$ x $\frac{7}{16}$ -inch adapter.....	$\frac{1}{2}$	.15

## PARTS FOR CUTTER BRACKETS

## Schedule A



Style A Gooseneck



Style B Gooseneck



1/2-in. Pole Plate



1/2-in. Grooved Pole Plate



3/4-in. Grooved Pole Plate



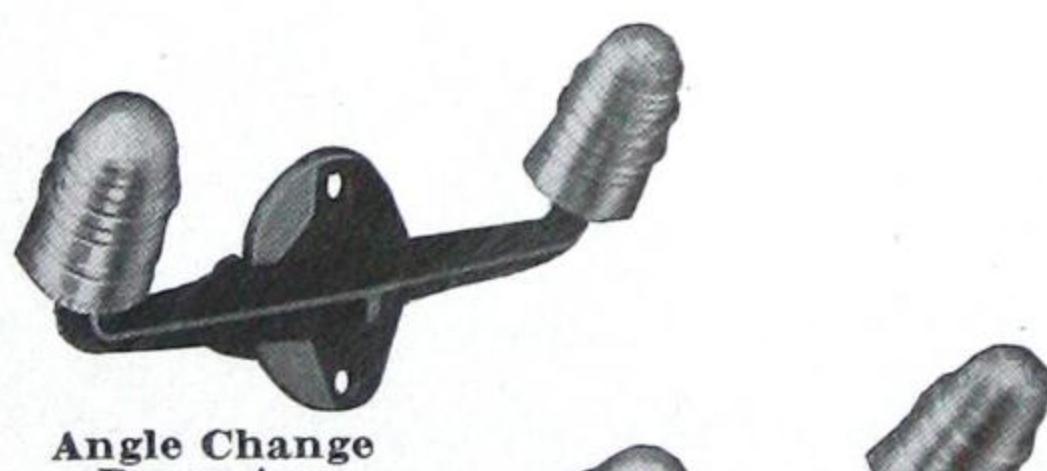
3/4-in. Wall Flange



Standard Cross-Arm



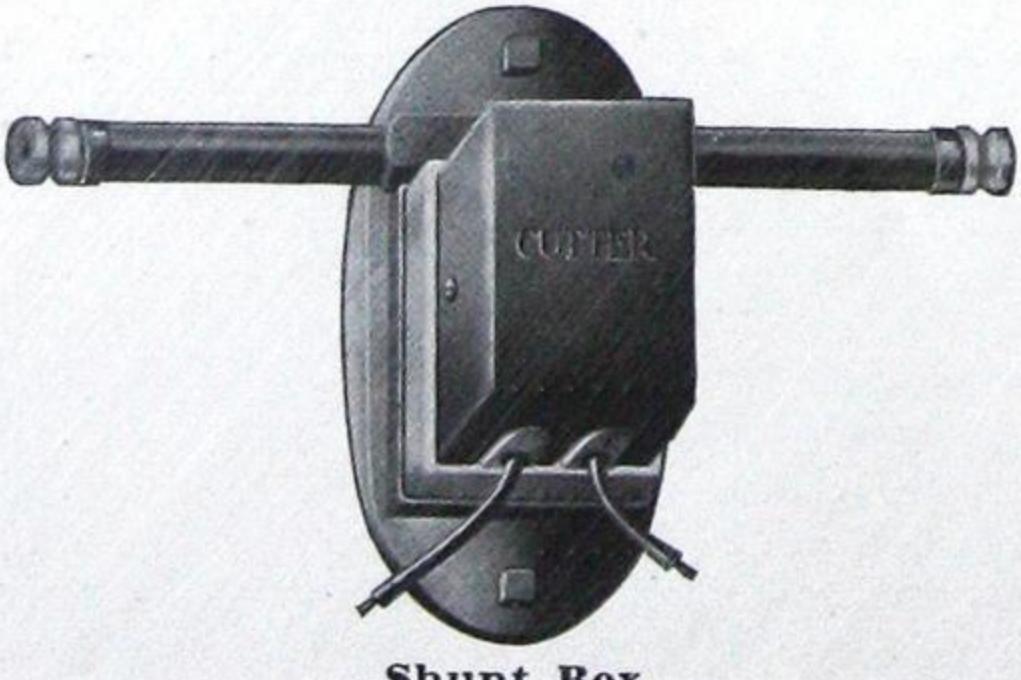
Standard Brace Arm



Angle Change Brace Arm



Iron Cross-Arm



Shunt Box

## GOOSENECKS

Trade No.	Style A	Style B	Length Feet	Size of Pipe Inches	Std. Pkg.	Wt. Lbs. Each	Price Each
21362	21362	21365	3	1/2	200	2 7/8	\$0.50
21363	21363	21366	4	1/2	150	3 7/8	.65
21364	21364	21367	5	1/2	125	4 7/8	.80
21439	21439	21442	3	3/4	150	3 3/4	.75
21440	21440	21443	4	3/4	125	4 3/4	.90
21441	21441	21444	5	3/4	100	5 3/4	1.15

## CURVED POLE PLATES

Trade No.	Description	Std. Pkg.	Wt. Lbs. Each	Price Each
20512	For 1/2-inch pipe.....	500	1	\$0.20
21487	Grooved, for 1/2-inch pipe.	400	1 1/4	.30
21438	Grooved, for 3/4-inch pipe.	400	2 1/4	.40

## WALL FLANGES

21488	Threaded for 1/2-inch pipe	500	1	.20
21489	To slip over 1/2-inch pipe..	500	1	.30
21490	Threaded for 3/4-inch pipe	400	2	.30
21491	To slip over 3/4-inch pipe..	400	2	.40

## CORNER PLATES

21492	For 1/2-inch pipe.....	300	2 1/2	.70
21493	For 3/4-inch pipe.....	200	2 1/2	.70

## HOOD INSULATORS

21494	With 1/2-inch pipe cap....	100	3	.90
21495	With 3/4-inch pipe cap....	100	3	.90

## STANDARD CROSS-ARMS

An enameled wood cross-arm with metal bound ends (to prevent splitting) and with the fittings bolted to the arm. This arm is used on the Cutter Standard and High Voltage Brackets.

21496	With 1/2-inch pipe fitting (female thread) above and 3/4 - inch wireable waste nut below.....	200	2	.50
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## STANDARD BRACE ARMS

An enameled and metal bound wood arm for guiding the wires to streethoods.

20507	With curved pole plate...	200	3	.55
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## IRON CROSS-ARMS

Used on the Cutter Iron Arm and Eastern Brackets. Tapped in the top for 1/2-inch pipe. Has a wireway underneath threaded for 3/4-inch nipple.

21497	With glass insulators.....	150	5	.80
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## ANGLE CHANGE BRACE ARMS

Made of cast iron with curved pole plate and fixed pins. May be used on front or back of pole.

21498	With glass insulators.....	150	6	.80
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## SHUNT BOXES

## Pole Type, with Brace Arm

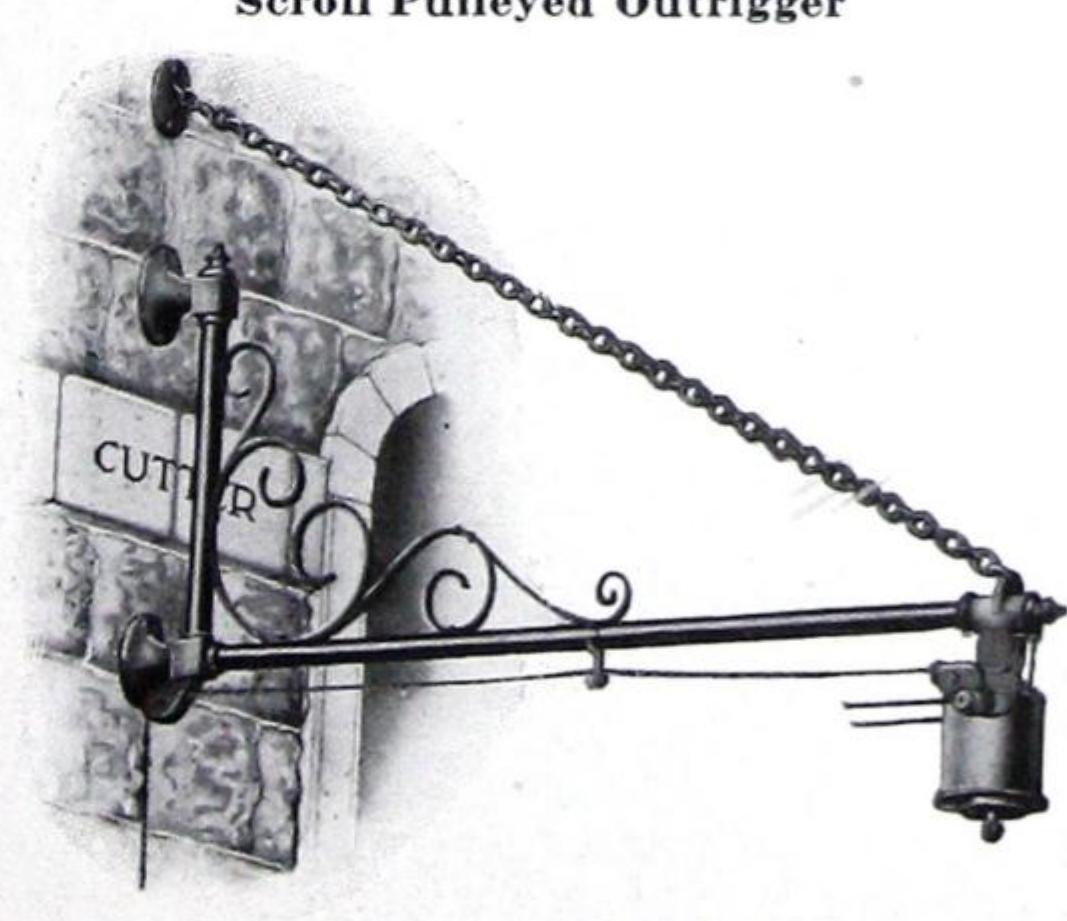
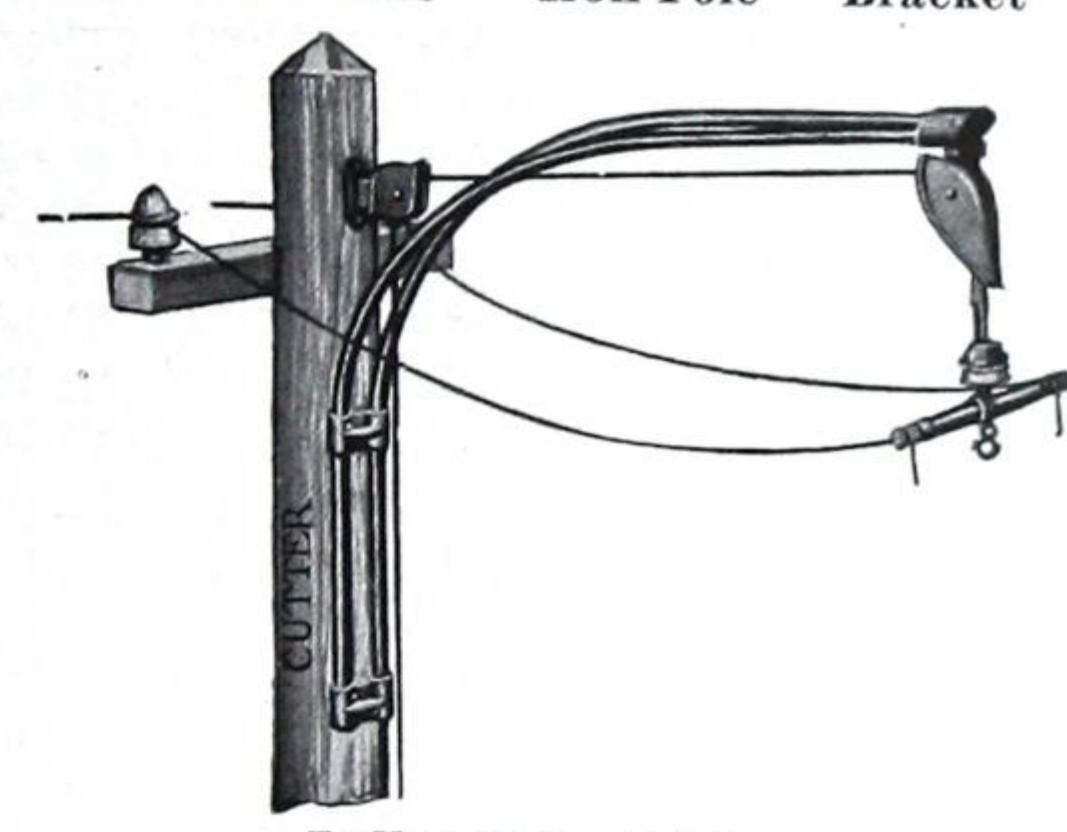
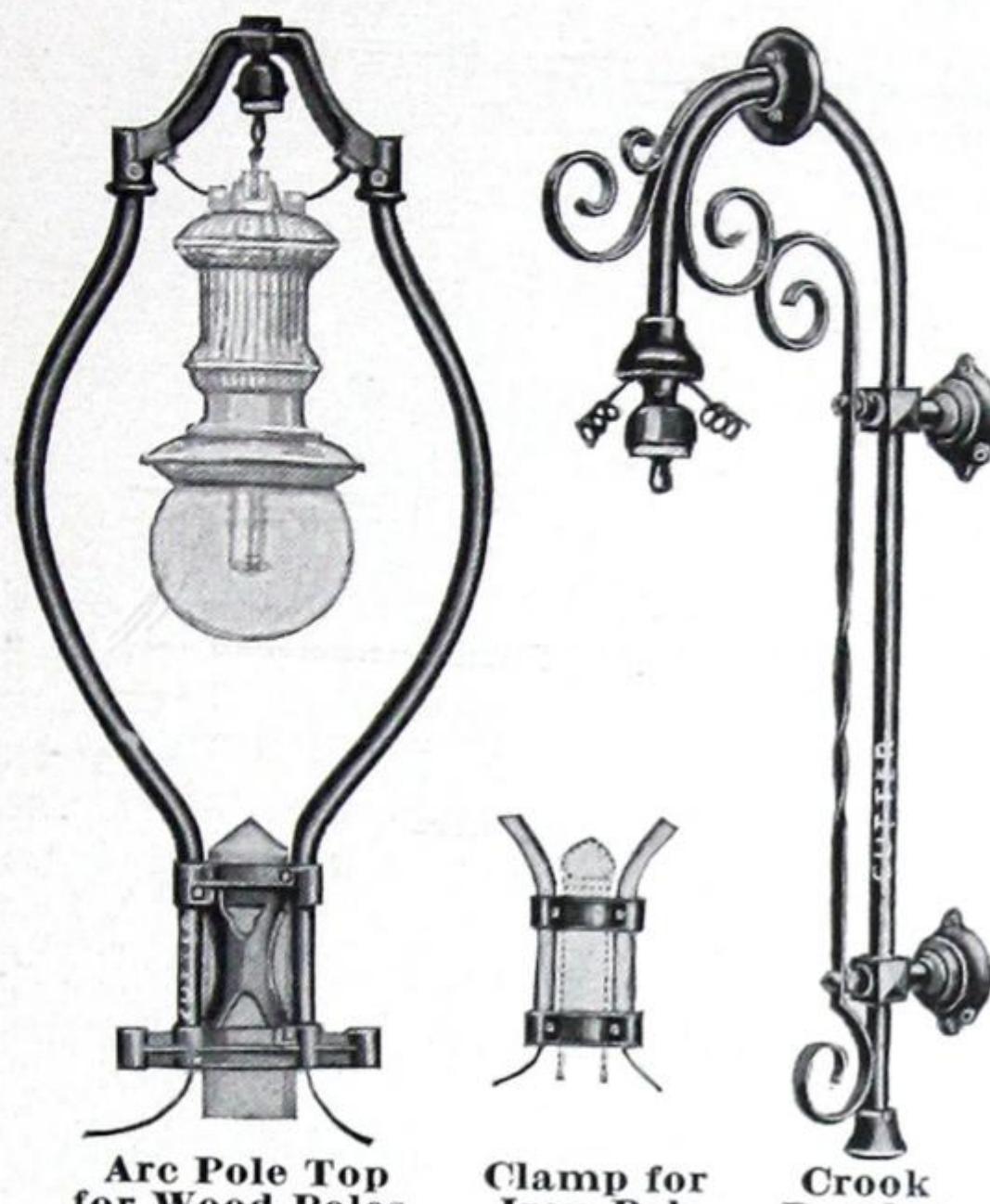
Has a reactance coil mounted in a weatherproof case insulated from the pole plate. The coil is for connecting in parallel with the Mogul Multiple Socket in the streethood and is designed to maintain constant current in a circuit without a regulator. Prices below are for 60-cycle coils. Prices for 25-cycle coils will be furnished on application.

Trade No.	C. P.	Std. Lamp	Wt. Pkg.	Lbs. Each	Price Each
3.5 or 4Amps.	6.6 Amps.				
20495	20501	32	15	10	\$5.65
20496	20502	40	15	11	5.80
20497	20503	60	15	12	5.95
20498	20504	80	15	13	6.20
20499	20505	100	15	14	6.50
20500	20506	250	15	16	9.40

An assortment of Cutter Streethood and Bracket Parts amounting to \$150.00 or over, constitutes a standard package.

## CUTTER ARC FIXTURES AND BRACKETS

Schedule C—Standard Package Quantity, 15 of One Style or Trade Number



### ARC POLE TOPS

Has a shadowless plate for wood poles made for wood pins to carry insulators. The wires are run through the curved  $\frac{3}{4}$ -inch pipes, out through porcelain bushings in the arch to the terminals of the lamp. Height from insulator hook to top of pole, 42 inches. Maximum spread of pipes, 27 inches. A pair of insulated reflector clamps No. 21989 will be furnished for 80 cents list extra.

Trade No.	Description	Wt. Lbs	Price Each
21990	For wood poles.....	28	\$6.00
21991	For $2\frac{1}{2}$ -inch bore pipe.....	34	6.00
21992	For 3-inch bore pipe.....	35	6.10
21993	For 4-inch bore pipe.....	36	6.30
21994	For 5-inch bore pipe.....	37	6.40

### CROOK BRACKETS

An ornamental arc lamp bracket made of  $1\frac{1}{4}$ -inch pipe with cast iron and wrought iron trimmings. Fitted with outlet bell and high voltage insulator on the outer end and with porcelain bushings in the plates for inner wiring. Holds the lamp  $31\frac{1}{2}$  inches from the wall. Over all height, 5 feet  $1\frac{1}{2}$  inches. Distance between centers of supporting plates,  $29\frac{1}{2}$  inches.

21995 With high voltage insulator. 43 13.00

### PULLEY POLE FIXTURES

A 3-foot fixture complete, with lamp-supporting and pole pulleys, enabling the lamp to be lowered for trimming. A substitute for a short mast arm. Furnished with flat plates for attaching to walls or square poles, when so ordered.

20537 With clamp knob only..... 27 \$5.90  
20538 With triple insulation arm.. 31 7.25

### SAFETY POLE FIXTURES

Same as pulley pole fixture, but with cut-out pulley in place of lamp-supporting pulley. See a following page for description of cut-out.

20759 With series cut-out pulley 43 14.45  
20760 With multiple cut-out pulley 43 14.45

### SCROLL PULLEYED OUTRIGGERS

An ornamental fixture with inner weatherproof pulley and outer lamp-supporting pulley and clamp knob for lowering the lamp. Pipe is of  $\frac{3}{4}$ -inch bore. Head piece made so guy wires may be used for steadyng the fixture. Prices do not include the rope.

Trade No.	With Wall Plate	With Pole Plate	Description	Wt. Lbs.	Price Each
21996	21997	3 feet, with clamp knob	36	\$5.25	
21998	21999	4 feet, with clamp knob	37	5.90	

For triple insulation arm, add \$1.65 list.

### FLAMING ARC BRACKETS

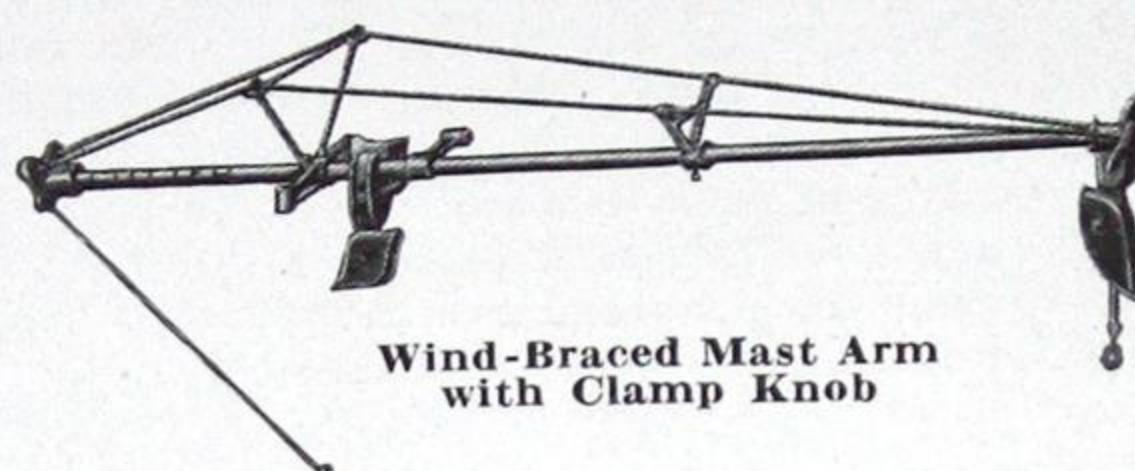
Designed for supporting heavy arc lamps in front of buildings. The pipe is  $1\frac{1}{4}$ -inch bore and guyed from the outer end by a chain. The ornamental scroll is made of heavy wrought iron. The lower pole plate has a pulley built in the casing. The cut-out pulley on the outer end allows the lamp to be lowered for trimming without lowering the wires. Furnished complete, as shown, without the rope or wires. Use  $\frac{3}{8}$ -inch Banner Core rope. Two chains furnished for 5-foot lengths.

Trade No.	With Multiple Pulley	With Series Pulley	Overhang Feet	Wt. Lbs.	Price Each
20574	20577	3	55		\$20.00
20575	20578	4	60		21.00
20576	20579	5	65		23.50

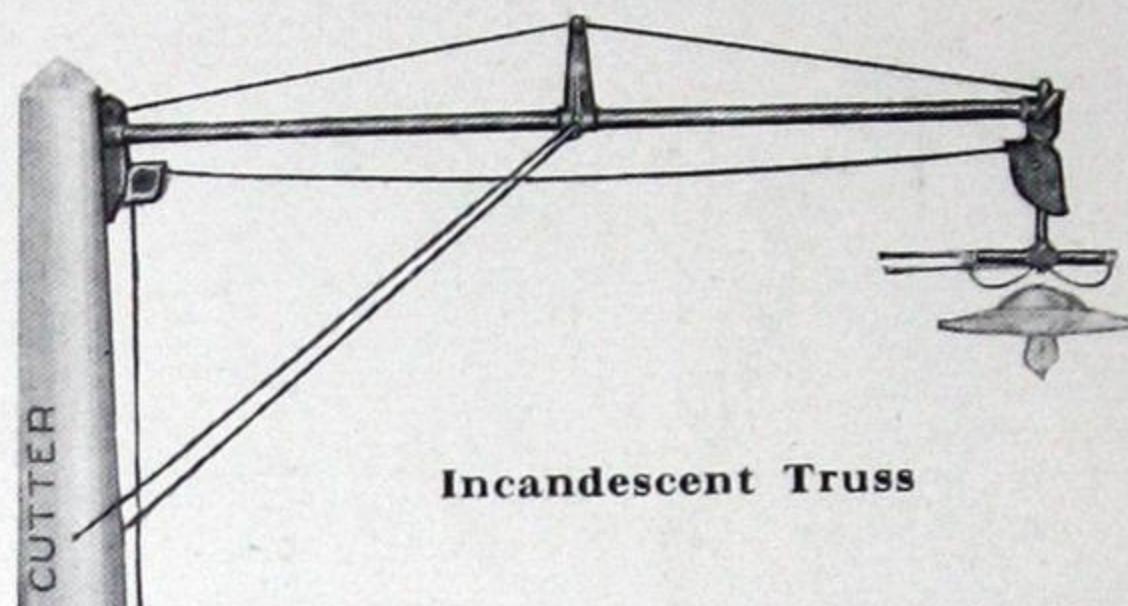
## CUTTER MAST ARMS

Schedule C—Standard Package Quantity, 15 of One Style or Trade Number

## WIND-BRACED MAST ARMS



Wind-Braced Mast Arm with Clamp Knob



Incandescent Truss

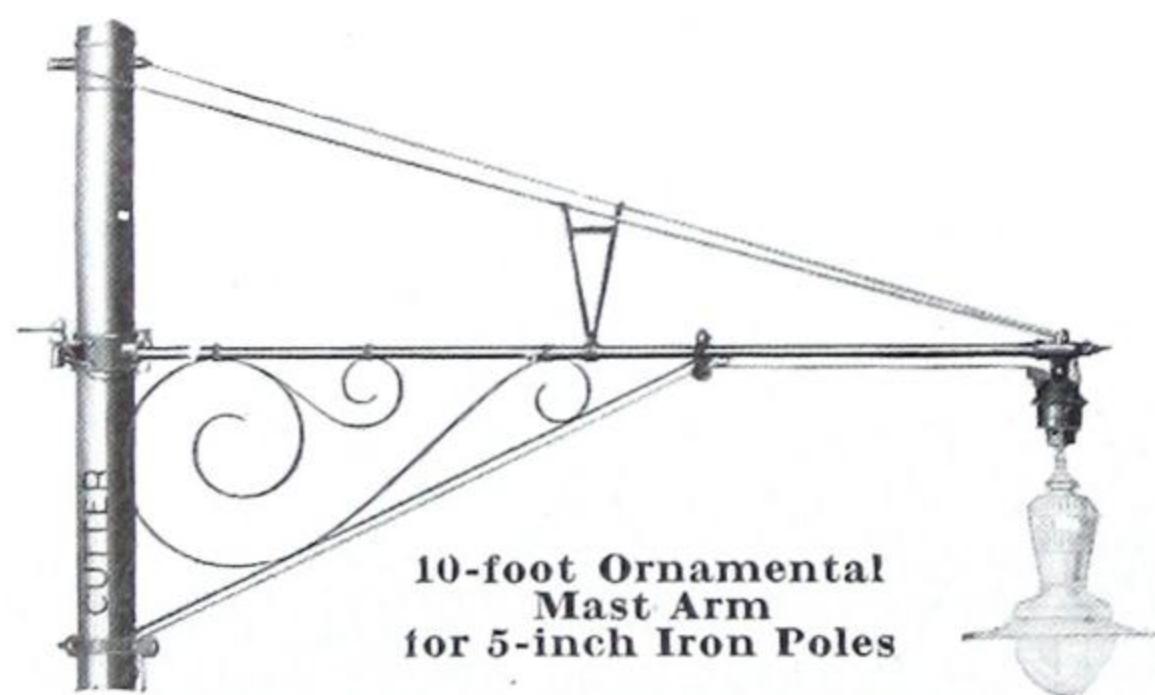
The only side mast arms having braces to prevent the arm from rocking on the pole. They have two strain rods run over a wrought iron truss at the pole and through the eyes of a stiffening triangle.

The base of the wrought iron truss has an extension brace which is bolted to the pole, while a similar brace (clamped to the piping) is bolted to the other side of the pole. These braces anchor the pipe firmly, using the whole diameter of the pole to keep the fixture from swaying sideways in the wind.

The mast arm proper can be partly assembled on the ground. The pole plate has a weather-proof pulley fastened to it, and the lamp-supporting pulley at the outer end makes this mast arm unusually complete.

Overhang Feet	Trade No.	Wt. Lbs.	Price Each
8	20586	79	\$14.80
10	20587	86	15.80
12	20588	93	17.75
14	20589	103	18.75
15	20590	113	19.25
16	20591	123	19.75
18	20592	133	20.75
20	20593	143	21.75

Trade No.	Wt. Lbs.	Price Each
20594	83	\$16.15
20595	90	17.15
20596	97	19.10
20597	106	20.15
20598	116	20.60
20599	126	21.10
20600	136	22.10
20601	146	23.10



10-foot Ornamental Mast Arm for 5-inch Iron Poles

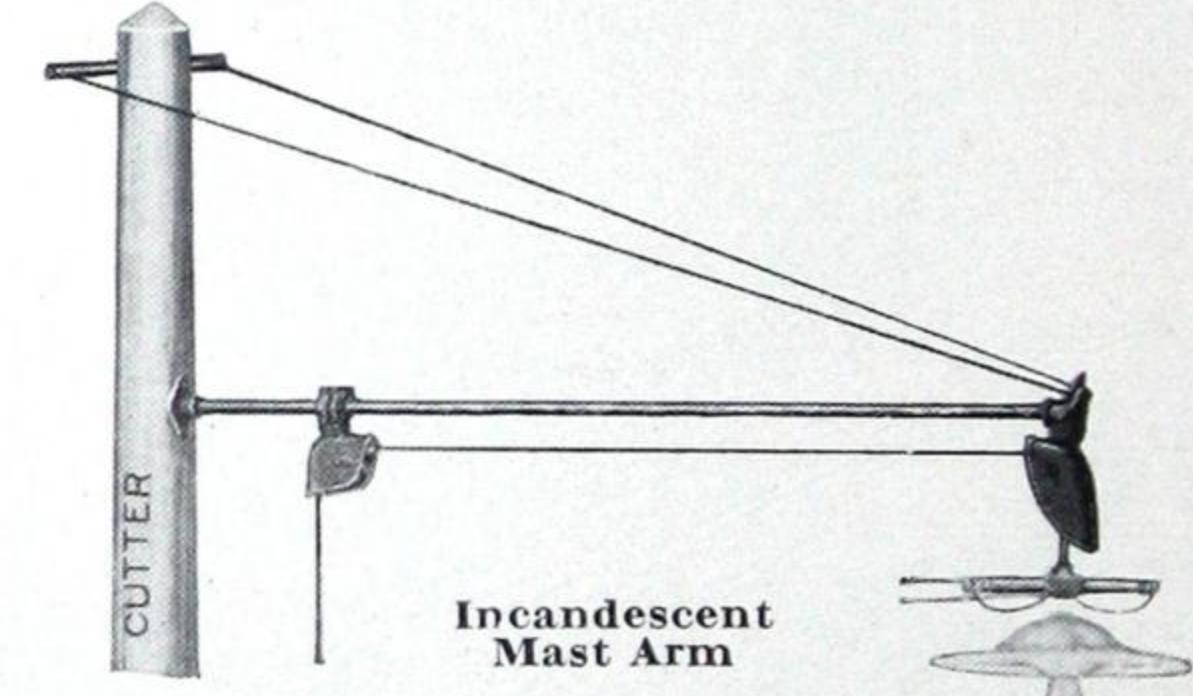
## ORNAMENTAL MAST ARMS

For 5-inch (Bore) Iron Poles

The 5-inch pole clamp has an arm with 1½-inch soxkets for insulator pins and a porcelain elbow to protect the wires which are run inside the 1¼-inch pipe. Shipped with cut-out pulley and scrolls, but without rope or wires. Extra center rod included with 14-foot and longer rams.

## With Series Cut-Out Pulley      With Multiple Cut-Out Pulley

Overhang Feet	Trade No.	Wt. Lbs.	Price Each	Trade No.	Wt. Lbs.	Price Each
6	21263	100	\$19.40	21272	100	\$19.40
8	21264	110	20.15	21273	110	20.15
10	21265	115	20.95	21274	115	20.95
12	21266	127	22.00	21275	120	22.00
14	21267	127	23.40	21276	127	23.40
15	21268	138	24.00	21277	138	24.00
16	21269	145	25.15	21278	145	25.15
18	21270	152	25.55	21279	152	25.55
20	21271	158	26.35	21280	158	26.35



Incandescent Mast Arm

## INCANDESCENT MAST ARMS

Designed especially for Cutter Inverted Cone Streethood Bodies. Shipped complete, as shown, with ¾-inch pipe arm, curved pole plate, inner weatherproof pulley, outer Petite Pulley with cross-arm, strain arm and rods, but without streethood body or rope.

Trade No.	Overhang Feet	Wt., Lbs. Each	Price Each
21281	6	30	\$5.00
21282	8	34	5.50
21283	10	38	6.00

## INCANDESCENT TRUSSES

Designed for use with Inverted Cone Streethood bodies listed on another page. Furnished complete, as shown, with 1-inch pipe arm, center truss, strain rod, pole plate with weather proof pulley, outer Petite Pulley with cross-arm, and side braces, but without streethood body or rope.

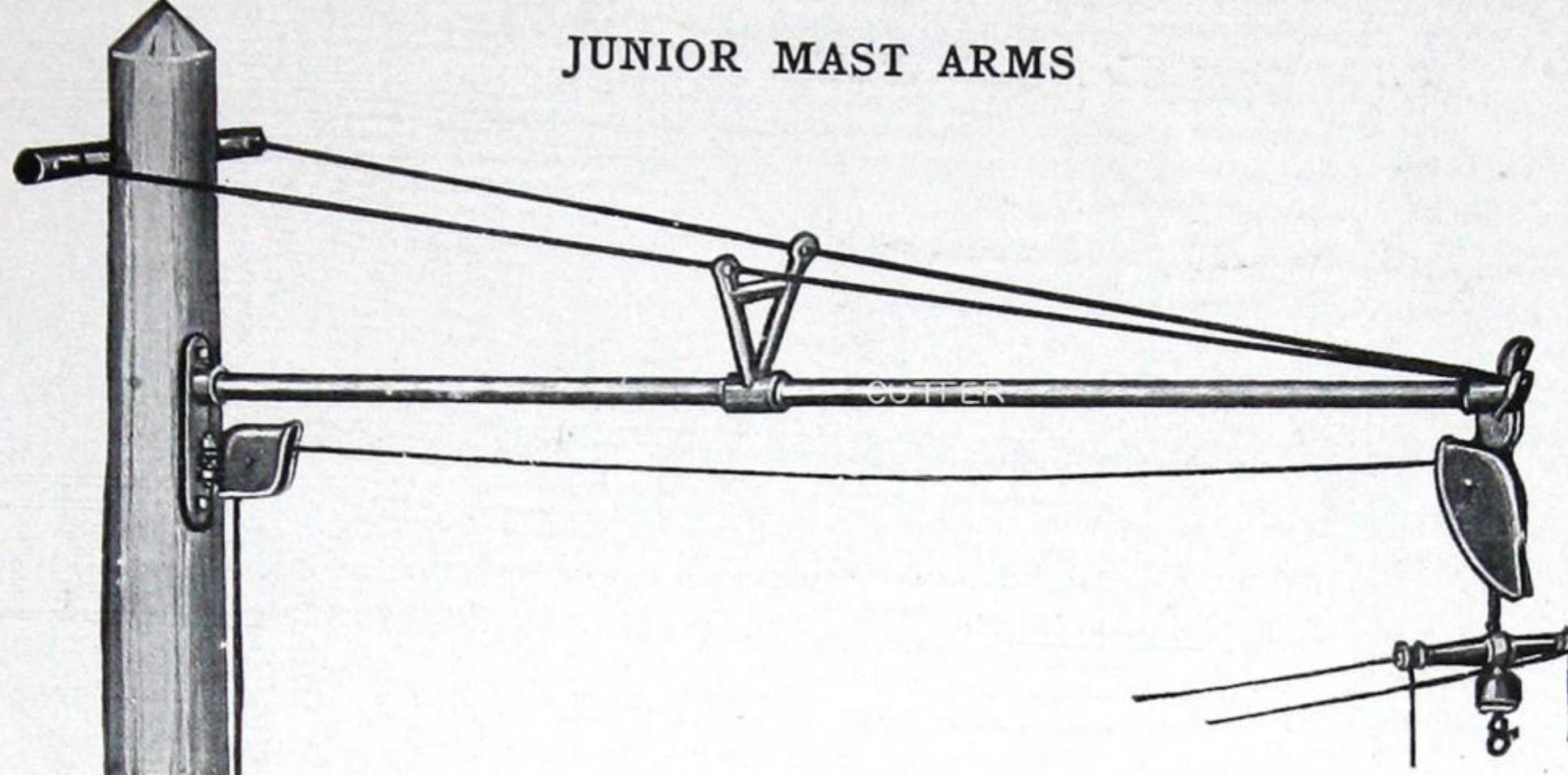
21284	6	41	6.00
21285	8	45	7.20
21286	10	49	8.40
21287	12	53	9.60

NOTE—When ordering, add "Cutter" to trade number.

## CUTTER MAST ARMS

Schedule C—Standard Package Quantity, 15 of One Style or Trade Number

## JUNIOR MAST ARMS



Junior Mast Arms are designed to meet the demand for a low priced, yet complete and well braced, mast arm, for holding arc lamps from 6 to 14 feet from the pole. They have a special pole plate with a weatherproof pulley fitted direct to it and a regular mast arm pulley (with lamp-supporting knob) fitted to the end of the pipe. Two steel strain rods run from this to the ends of a strong wrought iron strain arm, which is shipped complete with a pole plate for supporting it firmly on the pole.

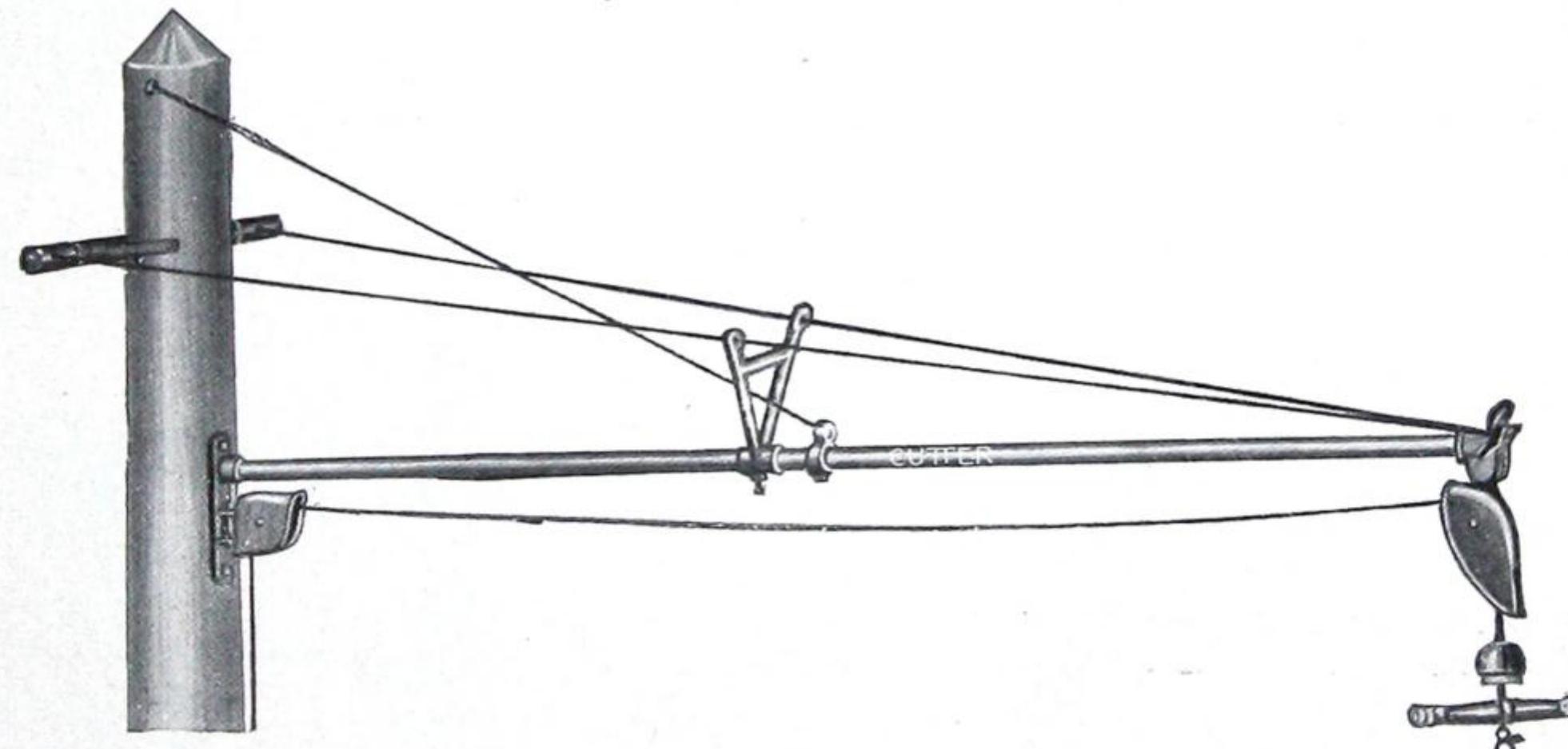
## With Clamp Knob only

Overhang Feet	Trade No.	Wt. Lbs.	Price Each
6	20618	48	\$ 7.70
8	20619	57	8.50
10	20620	60	9.30
12	20621	67	10.10
14	20622	72	10.85

## With Triple Insulation Arm

Trade No.	Wt. Lbs.	Price Each
20623	51	\$ 9.05
20624	60	9.85
20625	63	10.65
20626	70	11.45
20627	75	12.20

## LONG JUNIOR MAST ARMS



Long Junior Mast Arms are similar in design to Junior Mast Arms, but with patent side-braced strain arm and an extra support for the center of the pipe. The strain arm is made of wrought iron pipe (longer than that furnished with Junior Mast Arm), and has stiffening braces clamped to the pipe. These braces when bolted to the sides of the pole, greatly increase the strength of the strain arm and also keep it from rocking on the pole when high winds tend to sway the whole fixture. Furnished with cut-out pulley in place of lamp—supporting pulley with clamp knob, for \$8.35 list additional.

## With Clamp Knob only

Overhang Feet	Trade No.	Wt. Lbs.	Price Each
6	20628	52	\$ 8.50
8	20629	61	9.30
10	20630	64	10.05
12	20631	70	10.85
14	20632	79	12.05
15	20633	85	12.45
16	20634	90	12.85
18	20635	94	13.80
20	20636	100	14.80

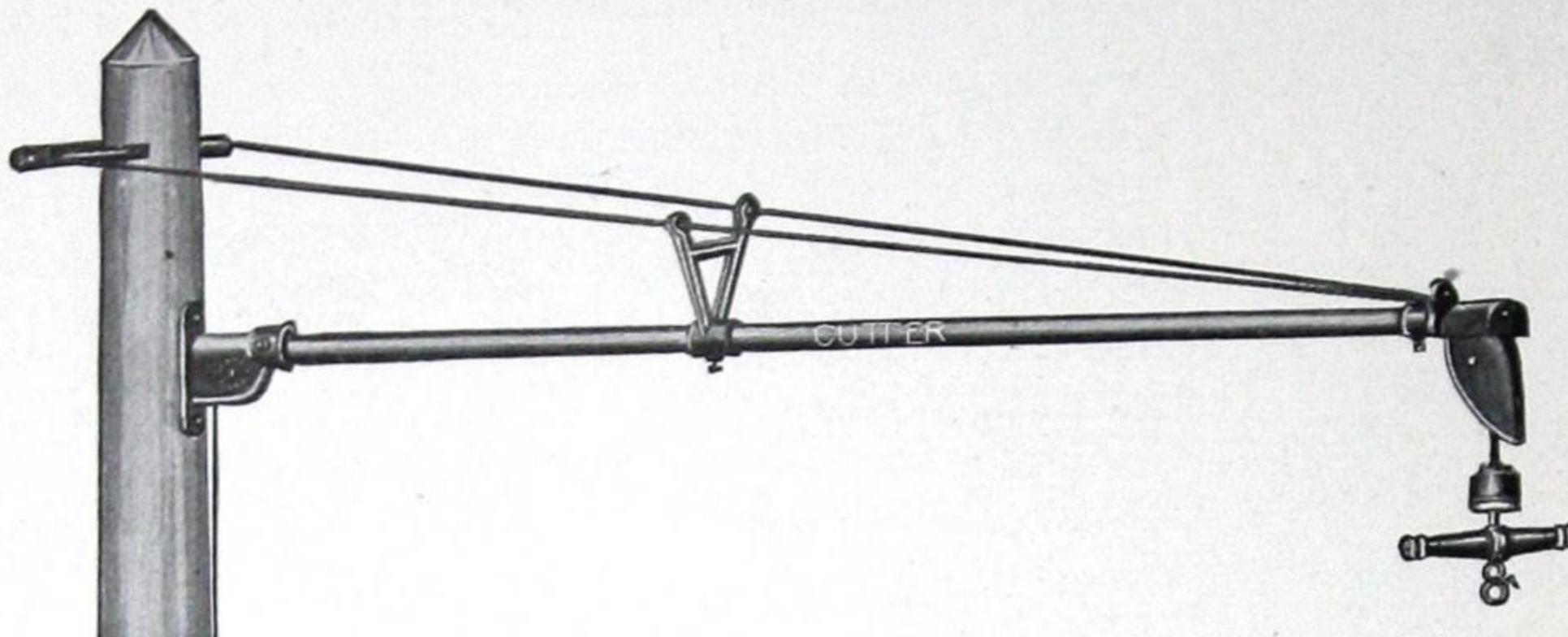
## With Triple Insulation Arm

Trade No.	Wt. Lbs.	Price Each
20637	55	\$ 9.85
20638	64	10.65
20639	67	11.40
20640	73	12.20
20641	83	13.40
20642	89	13.80
20643	93	14.20
20644	98	15.15
20645	104	16.15

Center rod is included with 14-foot and longer arms.

## CUTTER MAST ARMS

Schedule C—Standard Package Quantity—15 of One Style or Trade Number  
INNER-ROPE MAST ARMS



These mast arms have the pole pulley built inside the pole plate and are fitted with inner-rope pulley at the outer end, thus allowing the rope to pass through the piping.

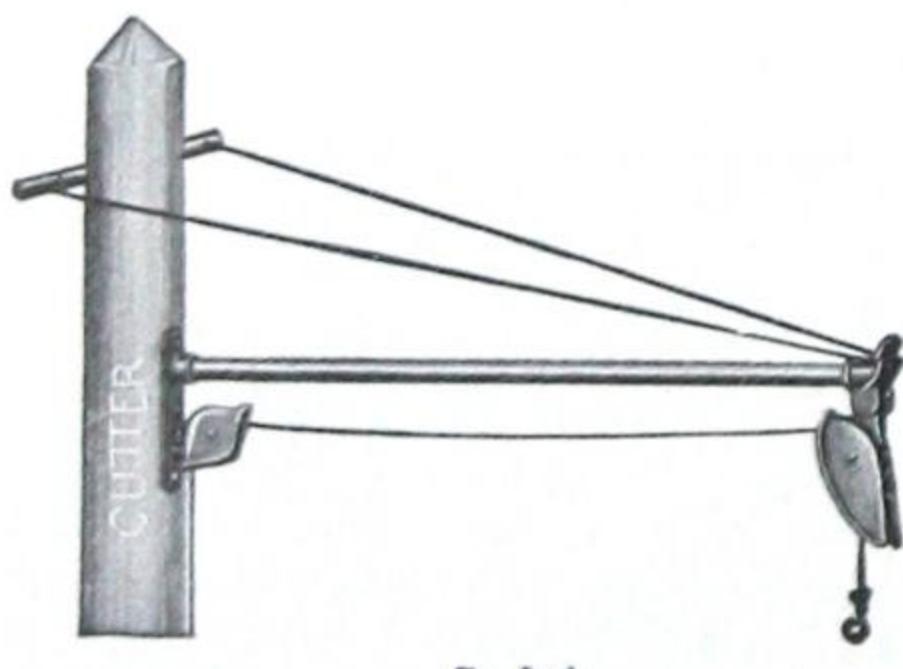
Overhang Feet	With Clamp Knob only			With Triple Insulation Arm		
	Trade No.	Wt. Lbs.	Price Each	Trade No.	Wt. Lbs.	Price Each
6	20680	50	\$ 7.70	20689	53	\$ 9.05
8	20681	56	8.50	20690	59	9.85
10	20682	66	9.30	20691	69	10.65
12	20683	76	10.05	20692	79	11.40
14	20684	91	12.45	20693	89	13.80
15	20685	95	12.85	20694	99	14.20
16	20686	101	13.25	20695	109	14.60
18	20687	111	14.25	20696	119	15.60
20	20688	121	15.25	20697	129	16.60

Standard Cut-Out Pulley furnished in place of lamp supporting pulley with Clamp Knob for \$8.35 additional to list price.

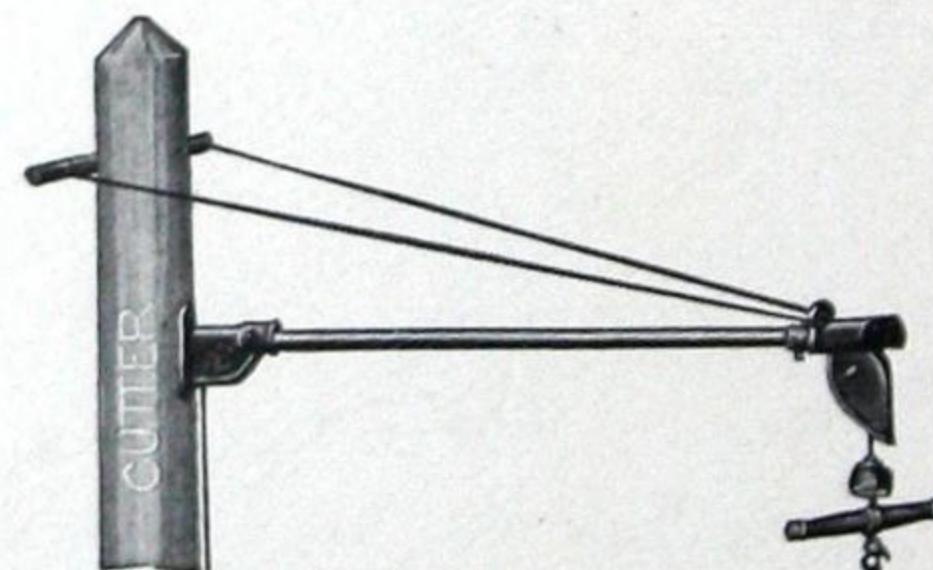
Extra center rod and double-braced strain arm furnished with 14-foot and longer arms.

6, 8, 10 and 12-foot arms furnished with double-braced strain arm when so ordered, for 80 cents additional.

## CADET AND CORPORAL MAST ARMS



Cadet



Corporal

## CADET MAST ARMS

Similar to Junior Mast Arms, but without the stiffening triangle.

Overhang Feet	With Clamp Knob only			With Triple Insulation Arm		
	Trade No.	Wt. Lbs.	Price Each	Trade No.	Wt. Lbs.	Price Each
4	20698	35	\$5.90	20701	39	\$7.25
6	20699	40	6.70	20702	44	8.05
8	20700	49	7.50	20703	53	8.85

## CORPORAL MAST ARMS

Similar to inner-rope mast arm, but without stiffening triangle.

4	20704	39	\$5.90	20707	43	\$7.25
6	20705	44	6.70	20708	48	8.05
8	20706	49	7.50	20709	53	8.85

## CUTTER CUT-OUT PULLEYS

Schedule D—Standard Package Quantity, 10

STANDARD CUT-OUT PULLEY  
FOR SERIES OR MULTIPLE CIRCUITS

An ingenious, simple and positive device which sustains the lamp and holds it in contact independent of the hoisting rope.

When the lamp is lowered, the circuit is closed. The circuit wires are run taut to the pulley and are never lowered. The lamp can be lowered straight down without interfering with trolley wires or other obstacles.

Lamps can be cleaned, trimmed, adjusted or replaced on live circuits with perfect safety. The pulley acts as a positive insurance against accidents and protects expensive lamps from damage under adverse conditions.

No ladders or poles to climb.

It is designed particularly for use on very high voltage circuits either D. C. or A. C.

The contacts are self-cleaning.

There is nothing about the pulley to wear or get out of order.

The switching and supporting features are entirely automatic and certain in operation.

You pull the rope—the pulley does the rest.

Made for rope or chain as ordered.

Recommended for use with Wind-braced and Long Junior Mast Arms in place of outer mast arm pulleys.

## STANDARD CUT-OUT PULLEYS

Trade No.	For Series Circuits	For Multiple Circuits	Description	Wt. Lbs.	Price Each
20761	20771		Threaded for 1 $\frac{1}{4}$ -inch pipe.....	25	\$10.00
20762	20772		Threaded for 2-inch pipe.....	25	10.00
20763	20773		With cable clamp.....	25	10.00
20764	20774		With $\frac{3}{4}$ -inch sleeve clamp.....	25	10.00
20765	20775		With 1-inch sleeve clamp.....	25	10.00
20766	20776		With 1 $\frac{1}{4}$ -inch sleeve clamp.....	25	10.00
20767	20777		With 1 $\frac{1}{2}$ -inch sleeve clamp.....	25	10.00
20768	20778		With 1 $\frac{1}{4}$ -inch mast arm clamp..	25	10.00
20769	20779		With 1 $\frac{1}{2}$ -inch mast arm clamp..	25	10.00
20770	20780		With ceiling plate.....	25	10.00

Nos. 20761, 20762, 20771 and 20772 are rigid and designed for use on inner-rope fixtures. Other styles are free to swing into line with hoisting rope.

Use Cutter  $\frac{3}{8}$ -inch hoisting Rope or  $\frac{1}{4}$ -inch Ebony Wire Rope with these pulleys. Made for use with galvanized chain when so ordered.

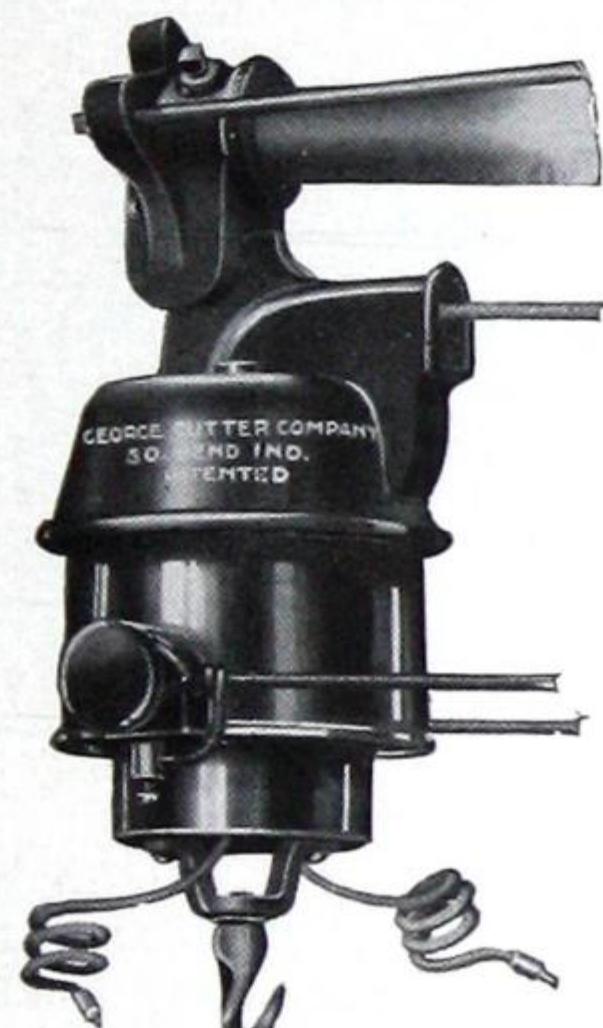
## JUPITER CUT-OUT PULLEYS FOR SERIES CIRCUITS

Built along the same general lines as Cutter Standard Cut-out Pulleys, but designed for extra heavy duty service. Recommended for D. C. and A. C. series circuits of 2300 volts or higher and for localities where atmospheric conditions demand extra high insulation and heavy current carrying parts. Made for rope or chain as ordered.

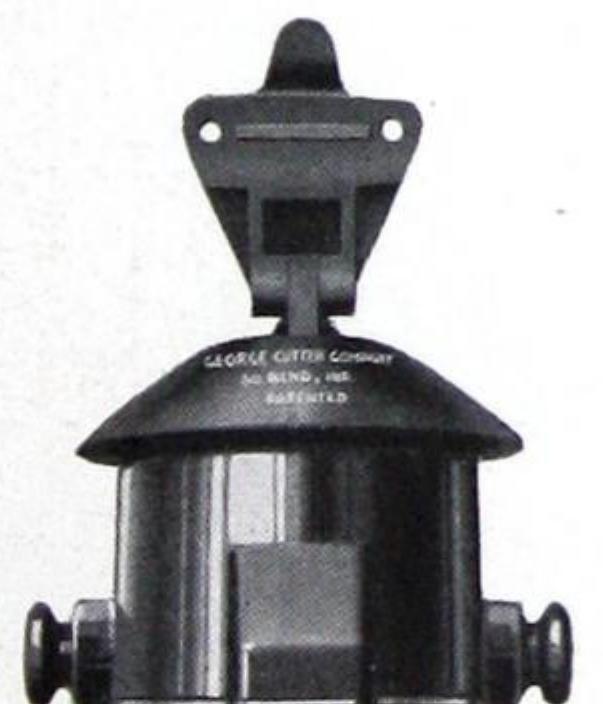
Trade No.	Description	Wt. Lbs.	Price Each
21470	With cable clamp.....	65	\$14.00
21471	With 1 $\frac{1}{4}$ -inch mast arm clamp.....	65	14.00
21472	With 1 $\frac{1}{2}$ -inch mast arm clamp.....	65	14.00
21473	With 2-inch mast arm clamp.....	65	14.00



Nos. 20763 and 20773



Nos. 20768 and 20778



End View of Jupiter Cut-out Pulley with Mast Arm Clamp

## CUTTER PULLEYS

## SCHEDULE D

## LAMP-SUPPORTING PULLEYS



Lamp-Supporting Pulley with Clamp Knob



Clamp Knob

Holds the lamp when raised and releases it when about to be lowered. Has a long swivel clamp to fit any size suspension wire or cable and a malleable iron clamp knob to hold the lamp. On raising the lamp, this knob is engaged by the pulley and takes all the strain off the rope. Another pull at the rope guides the knob out so that the lamp can be readily lowered. The action is entirely automatic. You pull the rope till it reaches a dead stop, and the pulley does the rest. There are no extra catches or fingers to bend out of shape or bind on the casing or to get clogged with sleet. It is the only weather proof safety pulley that works every time. The clamp knob clamps any size rope up to  $\frac{1}{2}$ -inch.

Trade No.	Description	Std. Pkg.	Wt. Lbs.	Price Each
20782	With clamp knob only.....	50	9	\$1.45
20783	With high voltage insulator.....	50	12	2.85
20784	With triple insulation arm.....	50	18	2.80
20785	With Jupiter Cross-Arm.....	50	16	3.25

For galvanizing, add 50 per cent to list price which includes final coat of black enamel.

## MAST ARM PULLEYS

A modification of the lamp-supporting pulley, having an extra strong single piece clamp, which fits the iron pipe of a mast arm and which also forms the headpiece, so that the strain rods can be run direct to it.

For  $1\frac{1}{4}$ -inch (Bore) Pipe

20786	With clamp knob only.....	50	10	\$1.65
20787	With high voltage insulator.....	50	13	2.55
20788	With triple insulation arm.....	50	14	3.00
20789	With Jupiter Cross-Arm.....	50	17	3.45

For  $1\frac{1}{2}$ -inch (Bore) Pipe

20790	With clamp knob only.....	50	10	\$1.65
20791	With high voltage insulator.....	50	13	2.55
20792	With triple insulation arm.....	50	14	3.00
20793	With Jupiter Cross Arms.....	50	17	3.45
20793	With Jupiter CrossArm.....	50	17	3.45

For galvanizing, add 50 per cent to list price which includes final coat of black enamel.

## INNER-ROPE PULLEYS

A lamp-supporting pulley with a hooded end clamp for use with mast arms in which the rope runs through the pipe.

For  $1\frac{1}{4}$ -inch (Bore) Pipe

20794	With clamp knob only.....	50	14	\$1.80
20795	With high voltage insulator.....	50	17	2.70
20796	With triple insulation arm.....	50	18	3.15
20797	With Jupiter Cross-Arm.....	50	21	3.60

For  $1\frac{1}{2}$ -inch (Bore) Pipe

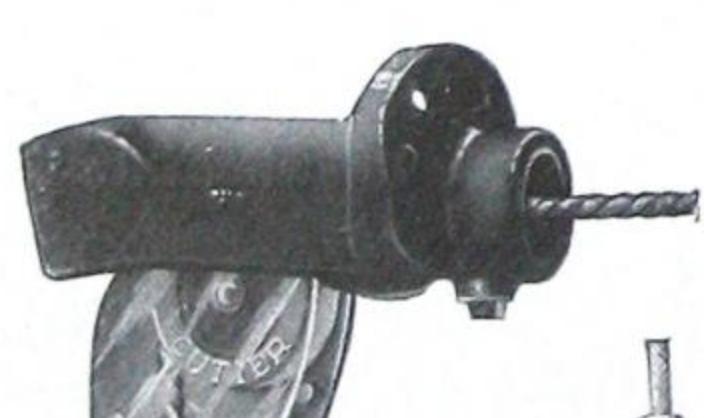
20798	With clamp knob only.....	50	14	\$1.80
20799	With high voltage insulator.....	50	17	2.70
20800	With triple insulation arm.....	50	18	3.15
20801	With Jupiter Cross-Arm.....	50	21	3.60

For galvanizing, add 50 per cent to list price which includes final coat of black enamel.

## CLAMP KNOBS

20802	With hook only.....	100	1 $\frac{1}{2}$	\$ .30
20803	With high voltage insulator.....	100	4 $\frac{1}{2}$	1.20
20804	With triple insulation arm.....	100	6	1.65
20805	With Jupiter Cross-Arm.....	100	9	2.10

For galvanizing, add 50 per cent to list price which includes final coat of black enamel.



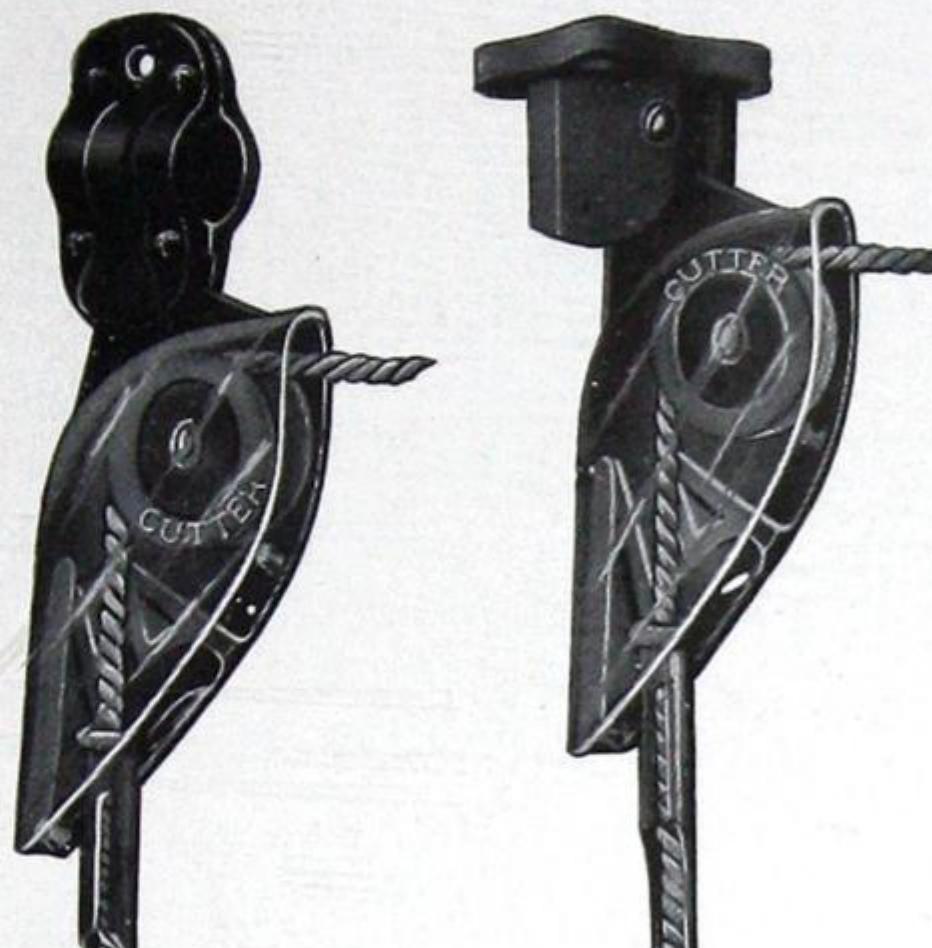
Inner-Rope Pulley



Clamp Knob with Triple Insulation Arm

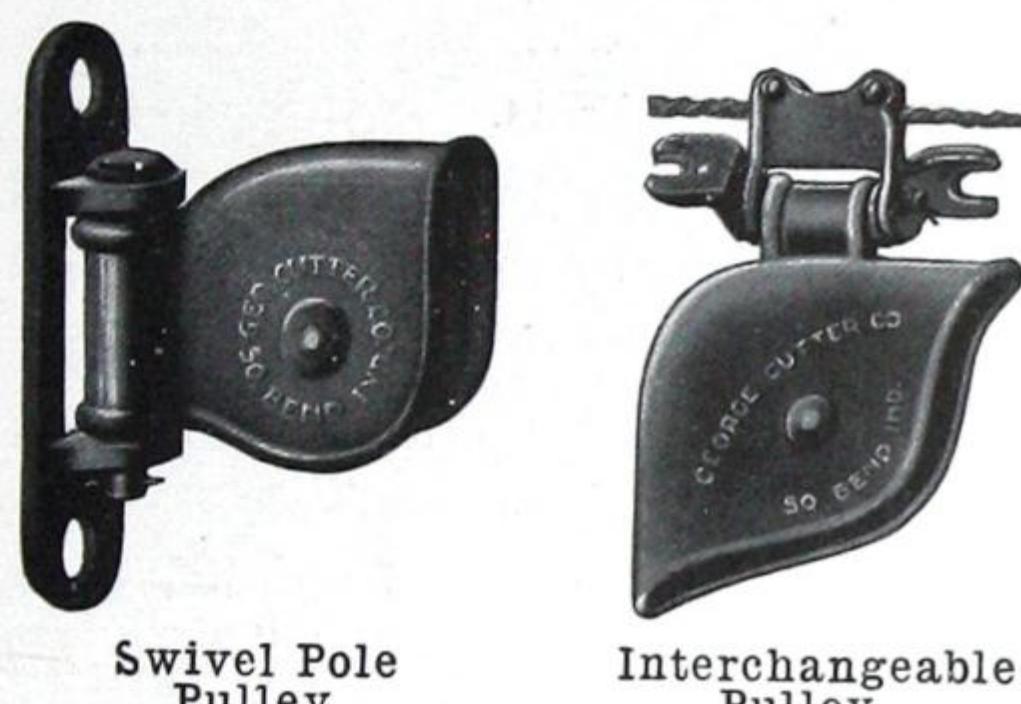
## CUTTER PULLEYS

## SCHEDULE D



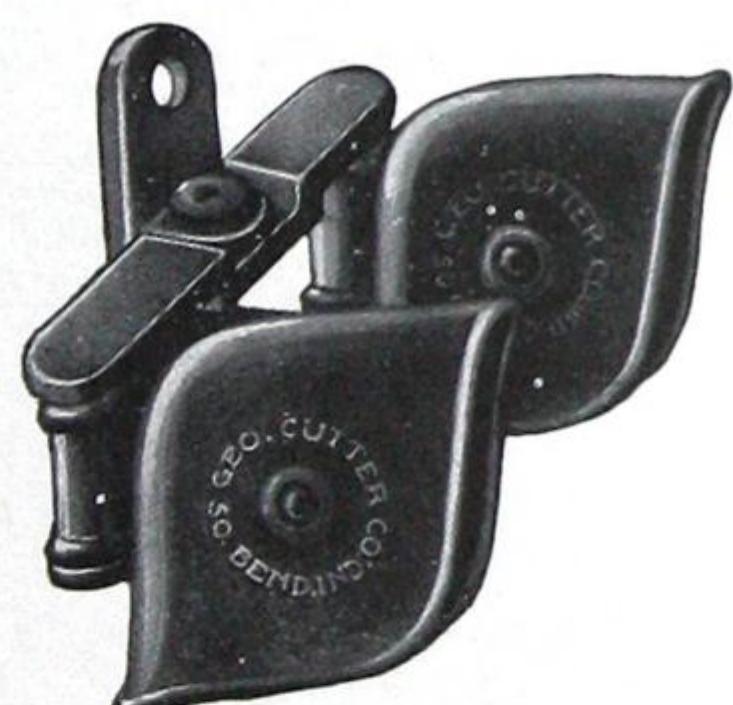
Outrigger Pulley

Ceiling Pulley

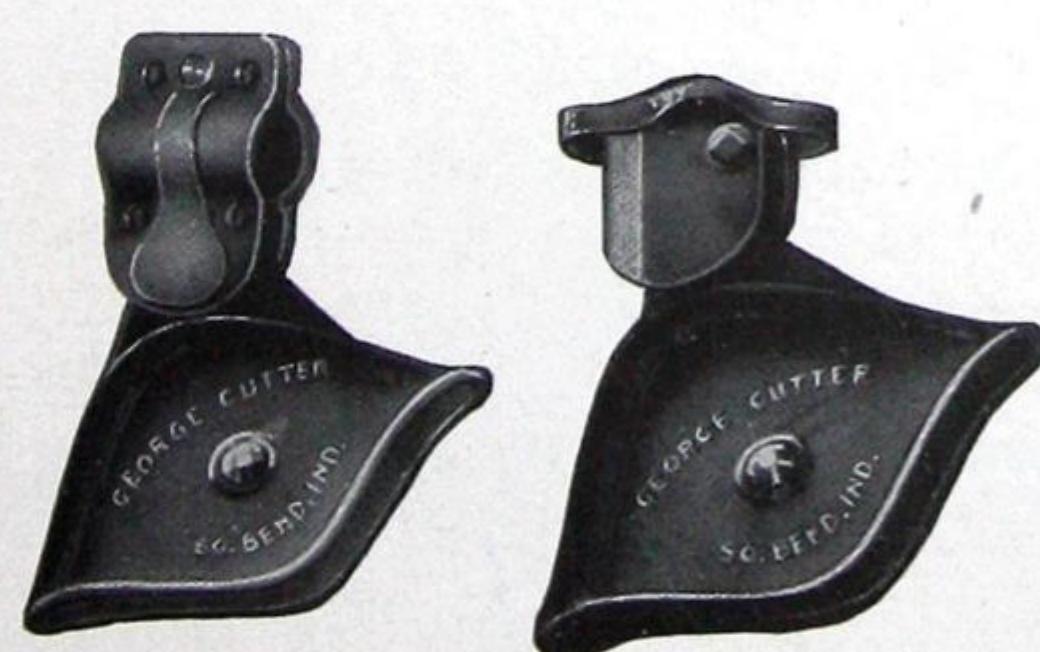


Swivel Pole Pulley

Interchangeable Pulley



Duplex Pole Pulley



Sleeve Pulley

Plain Roof Pulley

## OUTRIGGER PULLEYS

A form of the lamp-supporting pulley, with a clamp to fit the pipe. Furnished with clamp knob.

Trade No.	Description	Std. Pkg.	Wt. Lbs.	Price Each
20806	For $\frac{3}{4}$ -inch (bore) pipe.....	50	9	\$1.45
20807	For 1-inch (bore) pipe.....	50	9	1.50
20808	For $1\frac{1}{4}$ -inch (bore) pipe....	50	10	1.60
20809	For $1\frac{1}{2}$ -inch (bore) pipe....	50	10	1.65

## CEILING PULLEYS

A form of the lamp-supporting pulley, with a plate for use on bridges or under beams in shops or yards.

20810	With clamp knob only.....	50	9	\$1.65
20811	With triple insulation arm	50	13	3.00
20812	With Jupiter Cross-Arm....	50	16	3.45

## SWIVEL POLE PULLEYS

A weatherproof pole pulley, swiveled so that it can swing sideways and keep in line with the hoisting rope. Has a strong malleable iron pole plate.

20813	.....	100	$4\frac{1}{4}$	\$ .75
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## JUMBO POLE PULLEYS

Similar to the above, but larger, to take  $\frac{3}{4}$ -inch rope.

20814	.....	75	$5\frac{1}{2}$	\$1.10
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## DUPLEX POLE PULLEYS

Consists of a pair of swivel pole pulleys fastened to a simple malleable iron pole plate.

20815	.....	50	8	\$1.50
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## INTERCHANGEABLE PULLEYS

A weatherproof pulley with a universal clamp made of malleable iron, which will grip any standard size of suspension wire or cable. By taking out the two bolts the clamp can be opened out so as to form a wall plate, which fits the curved surface of a pole and which is easily fastened in place by lag screws. When so used, it makes a swiveled pole pulley similar in action to the Cutter Swivel Pole Pulley.

20816	.....	100	$4\frac{1}{4}$	\$ .75
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## JUMBO CHANGEABLE PULLEYS

Similar to the interchangeable pulley, but larger, to take  $\frac{3}{4}$ -inch rope.

20817	.....	75	$5\frac{1}{2}$	\$1.10
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## SLEEVE PULLEYS

A weatherproof pulley with a sleeve clamp to grip iron pipe.

20818	For $\frac{3}{4}$ -inch (bore) pipe.....	100	$5\frac{1}{4}$	\$ .80
20819	For 1-inch (bore) pipe.....	100	$5\frac{1}{2}$	.85
20820	For $1\frac{1}{4}$ -inch (bore) pipe....	100	$5\frac{3}{4}$	.90
20821	For $1\frac{1}{2}$ -inch (bore) pipe....	100	6	.95

## PLAIN ROOF PULLEYS

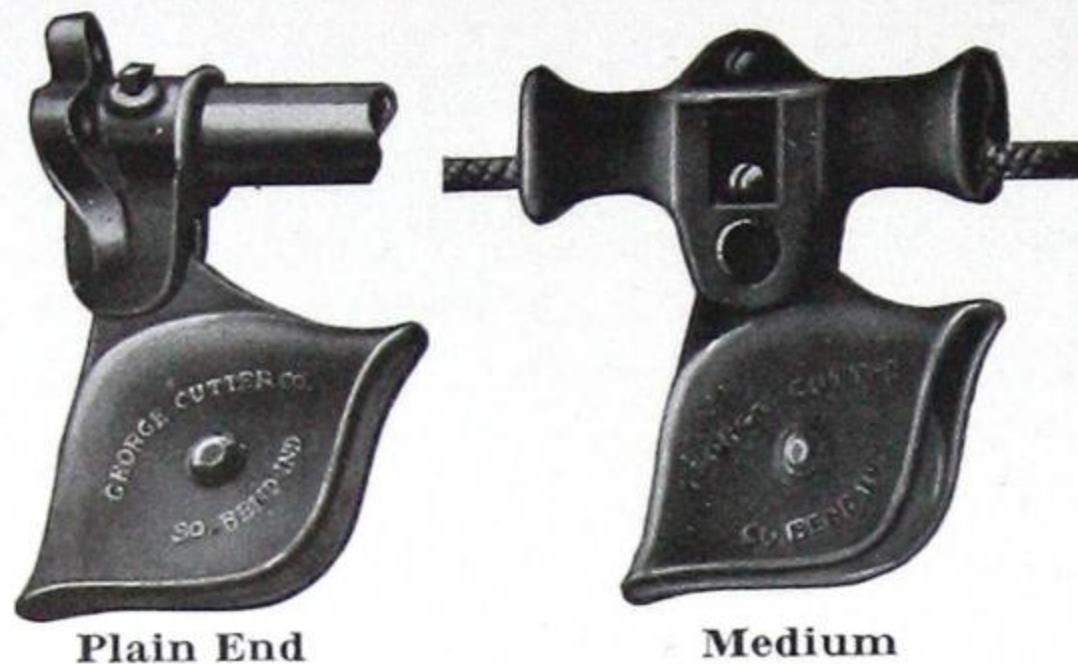
A companion to the ceiling pulley, with a ceiling plate for bridges, beams, etc.

20822	.....	100	$5\frac{1}{2}$	\$.90
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For galvanizing any of the above, add 50 per cent to list price, which includes final coat of black enamel.

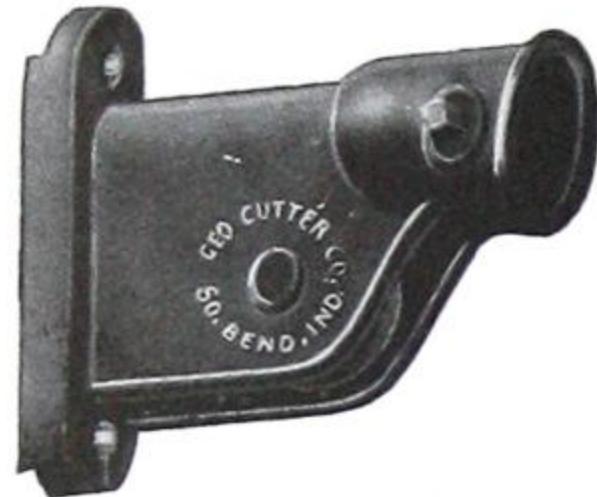
## CUTTER PULLEYS AND WINDLASSES

### SCHEDULE D



Plain End Pulley

Medium Pulley



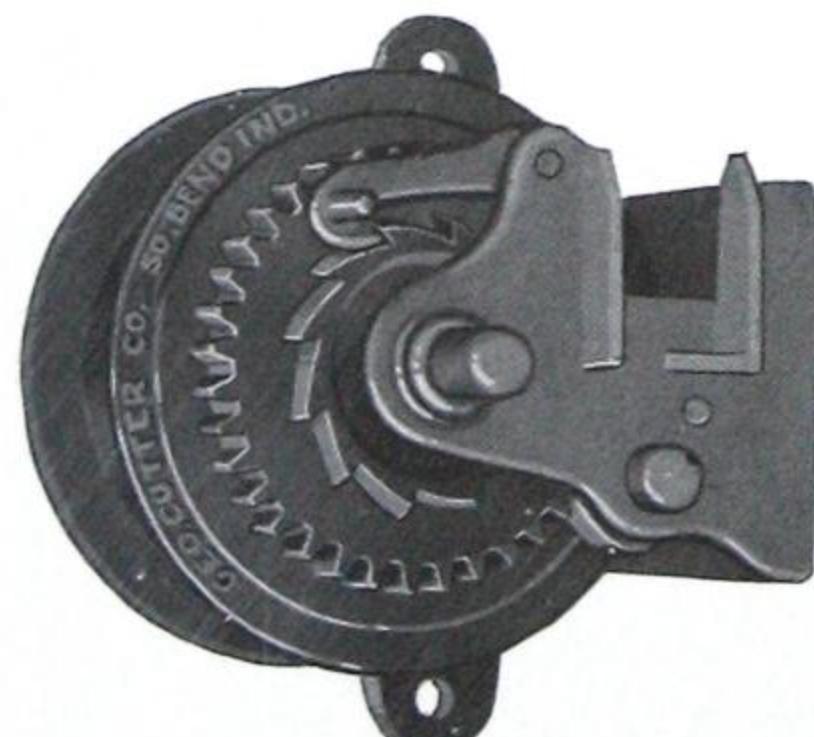
Pole Housing



Tail Pulley



Combination Pole Windlass



Combination Wall Windlass



Pinion Handle

#### PLAIN END PULLEYS

A plain weatherproof pulley with an end clamp to fit mast arm pipes.

Trade No.	Description	Std. Pkg.	Wt. Lbs.	Price Each
20823	For 1 1/4-inch (bore) pipe	100	6 1/2	\$0.90
20824	For 1 1/2-inch (bore) pipe	100	6 3/4	.90

#### MEDIUM PULLEYS

A center suspension pulley with long supporting clamp and weatherproof casing, but with no safety features. Takes any size rope up to 1/2 inch in diameter and is second only to the Cutter Lamp-Supporting Pulley.

20825	.....	100	5 1/2	\$0.75
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#### POLE HOUSING

The pole plate and pulley casing are made in one piece, with the sheaves placed so the rope can run through the pipe, as with the Cutter Inner-Rope and Corporal Mast Arms.

20826	For 1 1/4-inch (bore) pipe	75	6 1/2	\$1.20
20827	For 1 1/2-inch (bore) pipe	75	6 3/4	1.20

#### TAIL PULLEYS

A companion to the pole housing for use with Cutter Inner-Rope and Corporal Mast Arms.

20828	For 1 1/4-inch (bore) pipe	75	6 3/4	\$0.90
20829	For 1 1/2-inch (bore) pipe	75	7	.90

#### COMBINATION POLE WINDLASSES

These are self-locking safety windlasses which can be used either as plain or geared windlasses at the option of the trimmer. Can be used as a plain windlass to lower the lamp quickly and then as a geared windlass to raise the lamp. These windlasses are perfectly safe for heavy lamps, the whole device being made as fool-proof as possible.

The pinion handle is detachable so that it can be used with any number of windlasses.

The drum will hold 60 feet of 1/4-inch Ebony Wire Rope or 40 feet of 3/8-inch Banner Core Rope.

Prices below do not include handle.

20830	For wood poles.....	25	22	\$4.25
20831	For 5-inch (bore) pipe....	25	24	4.50
20832	For 6-inch (bore) pipe....	25	25	4.75
20833	For 7-inch (bore) pipe....	25	27	5.00

#### COMBINATION WALL WINDLASSES

Similar to the combination pole windlass, but with a side plate for fastening to walls.

20834	.....	25	24	\$4.50
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#### PINION HANDLES

For combination pole and wall windlasses.

20835	.....	25	4	\$1.50
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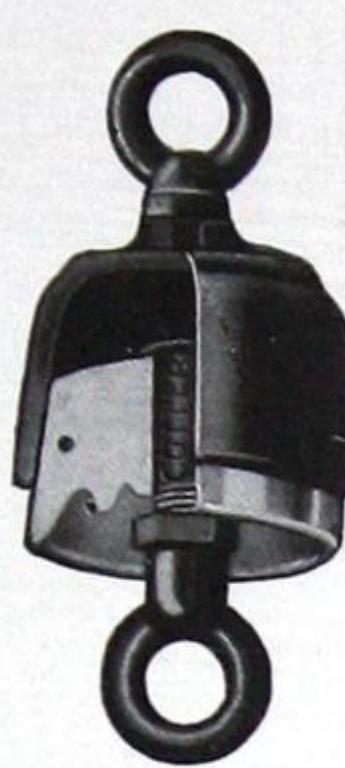
For galvanizing any of the above, add 50 per cent to list price, which includes final coat of black enamel.

## CUTTER INSULATORS AND CROSS-ARMS

### SCHEDULE E



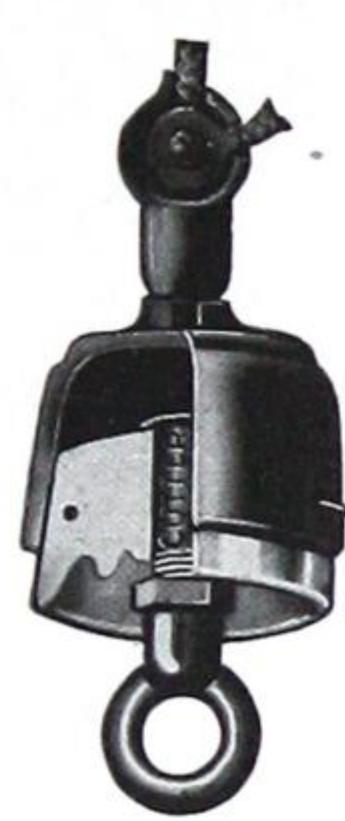
No. 20836



No. 20837



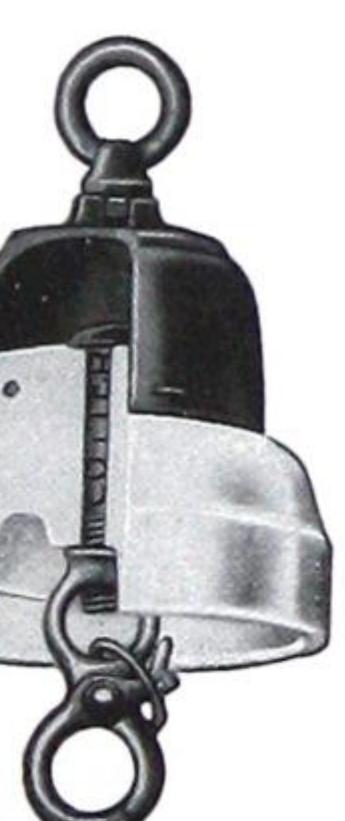
No. 20838



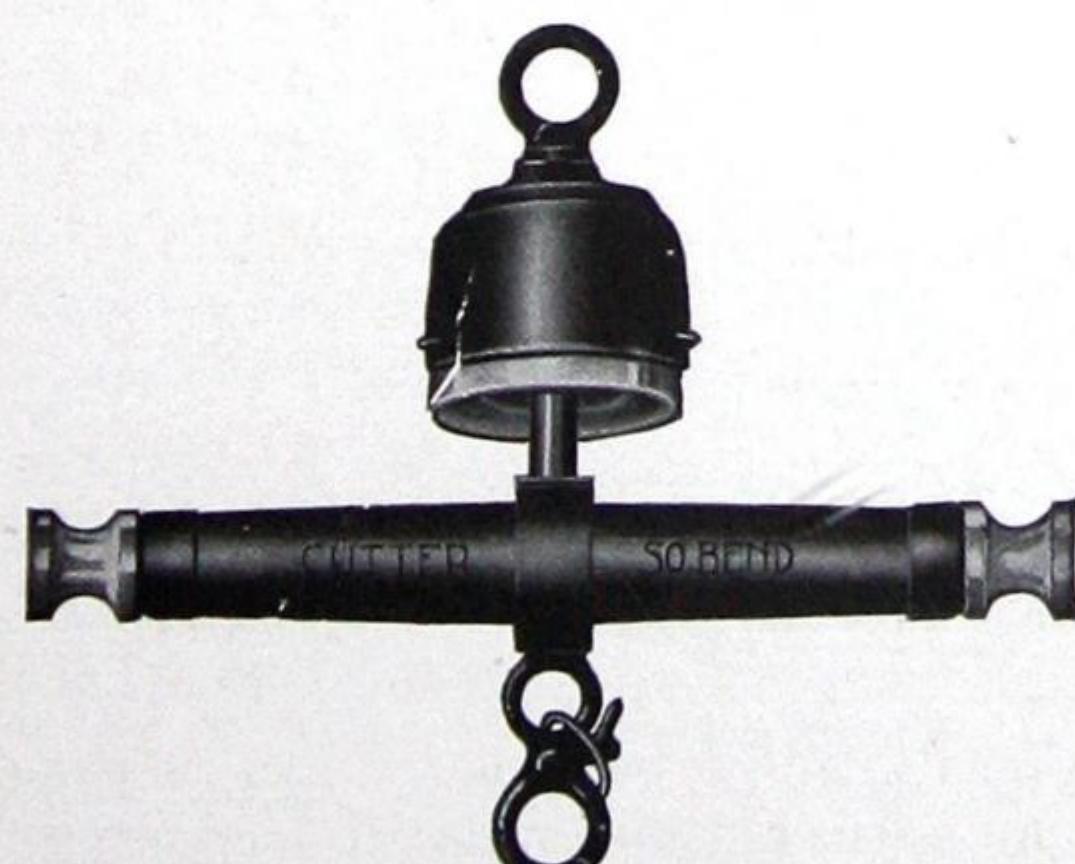
No. 20839



No. 20841



No. 20844



Triple Insulation Arm

### HIGH VOLTAGE INSULATORS

High voltage insulators have a double petticoat porcelain bell, which forms a good watershed and gives high insulation even in wet weather. The rivets which fasten the metal cap to the porcelain pass under the elongated head of the bolt which supports the hook. The cap is sealed with insulating material and the extra petticoat gives a large surface insulation, making the device well suited for use on arc circuits exposed to weather, smoke or fumes.

While designed especially for use on arc circuits of high voltage, the extra protection and the elimination of leakage afforded by this insulator make it a desirable one, even for circuits of comparatively low voltage.

Trade No.	Description	Wt. Std. Lbs. Pkg. Ea.	Price Each
20836	With ring above and sister hook below .....	100 4	\$0.90
20837	With ring above and ring below.....	100 4	.80
20838	With clamp for wire rope above and with sister hook below.....	100 4	1.10
20839	With clamp for wire rope above and with ring below.....	100 4	1.00
20840	With clamp for chain above and sister hook below.....	100 4	1.10
20841	With clamp for chain above and ring below .....	100 4	1.00

For galvanizing all iron parts, add 20 cents each to list price, which includes final coat of black enamel.

### JUPITER INSULATORS

Built on the same lines generally as high voltage insulators, but with a greatly enlarged series of petticoats to give higher surface insulation. Therefore it has the same high breakdown insulation (ample for 12000-volt circuits) and an extra large surface to reduce the leakage in wet weather.

20844	With ring above and sister hook below .....	75 6	\$1.35
20845	With ring above and ring below.....	75 6	1.25

For galvanizing all iron parts, add 20 cents each to list price, which includes final coat of black enamel.

### TRIPLE INSULATION ARMS

Triple insulation arms have a high voltage insulator above an enameled wood arm, thus giving a triple insulation between the line wire and the supporting ring.

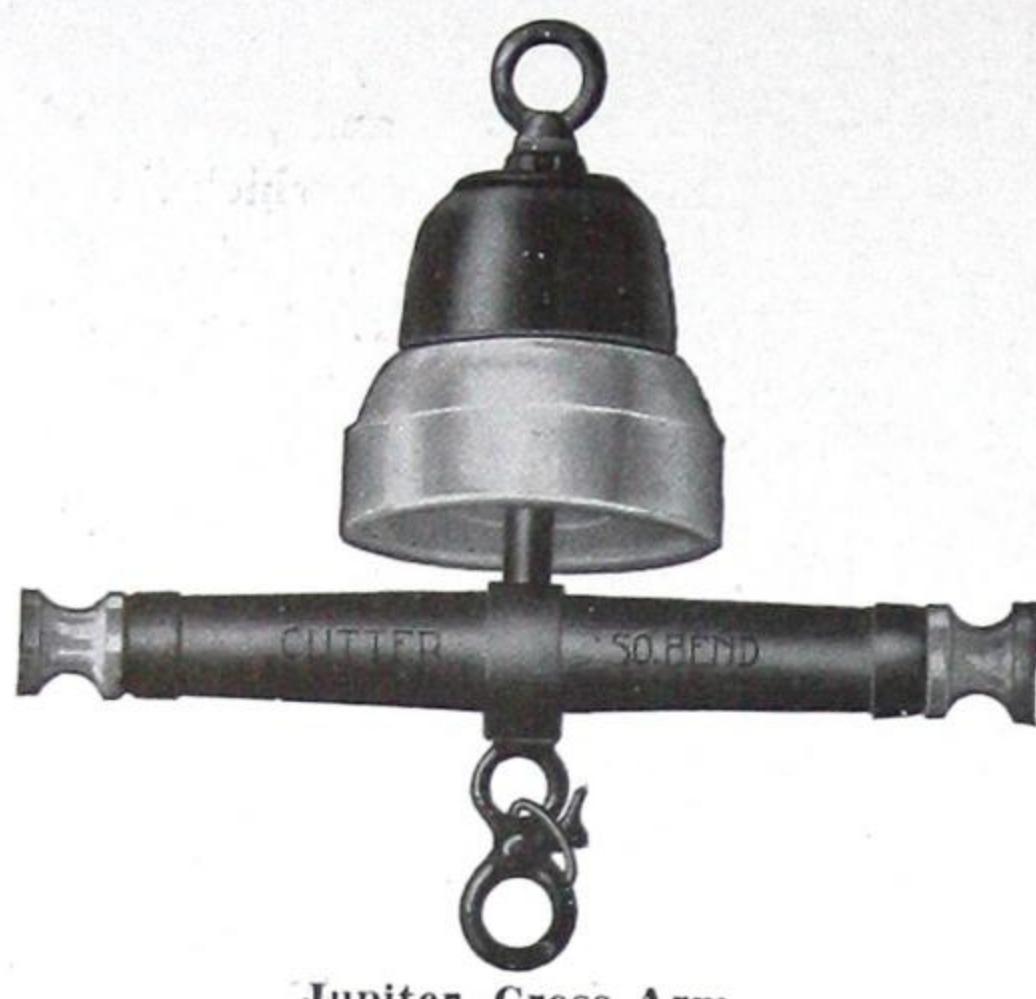
The arm is coated with a baked enamel, which outwears paint in the weather, and has its ends bound by strong metal ferrules to prevent their splitting. Every part of the whole device is built for fine wear and high insulation, making it a fine insulating arm for all high voltage lamps, and the only low priced one adapted for use with alternating series lamps. It is second only to the Jupiter Cross-Arm.

Trade No.	Finish	Std. Pkg.	Wt., Lbs. Each	Price Each
20852	Enameled	75	5	\$1.35
20853	Galvanized*	75	5	1.60

\*Includes final coat of black enamel.

## CUTTER INSULATORS AND CROSS-ARMS

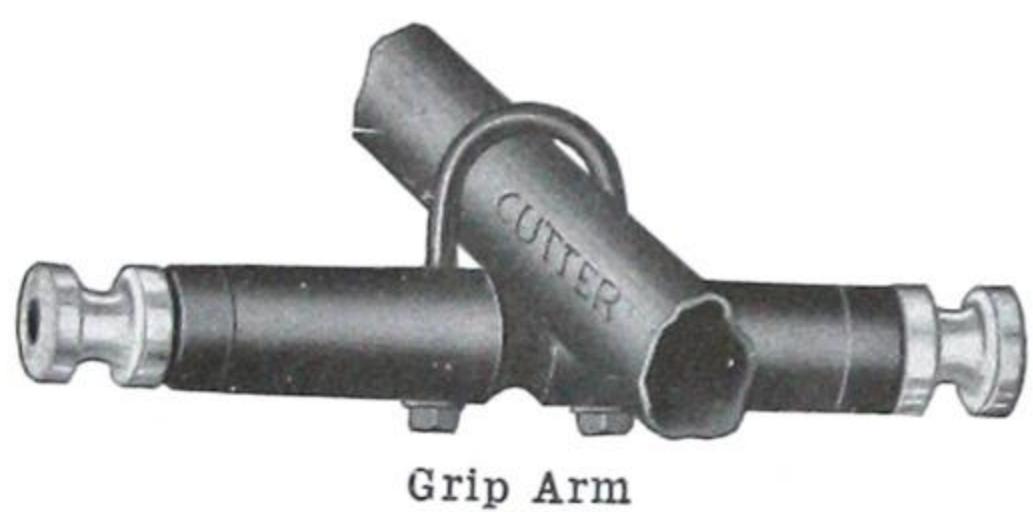
## SCHEDULE E



Jupiter Cross-Arm



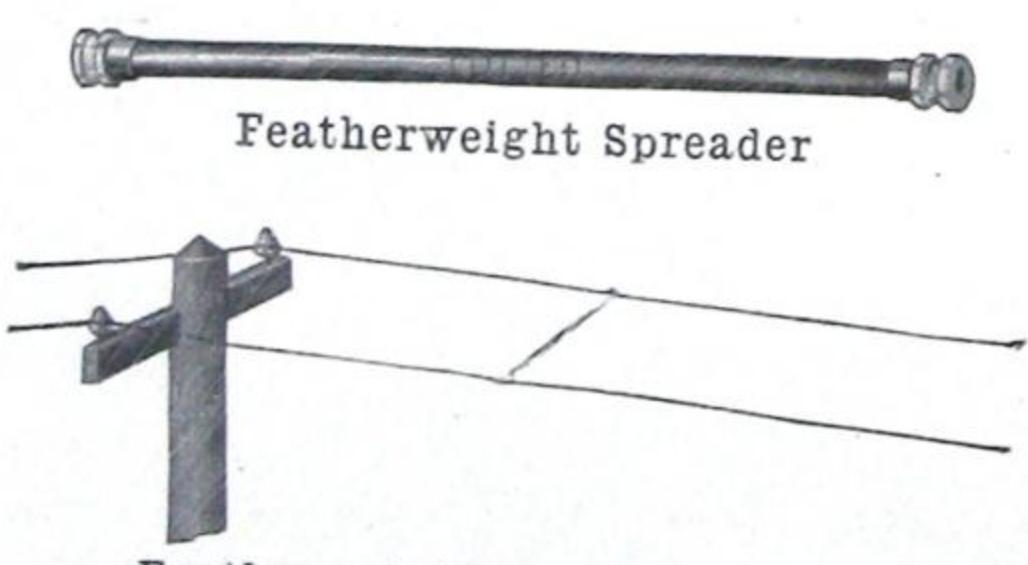
Plain Arm



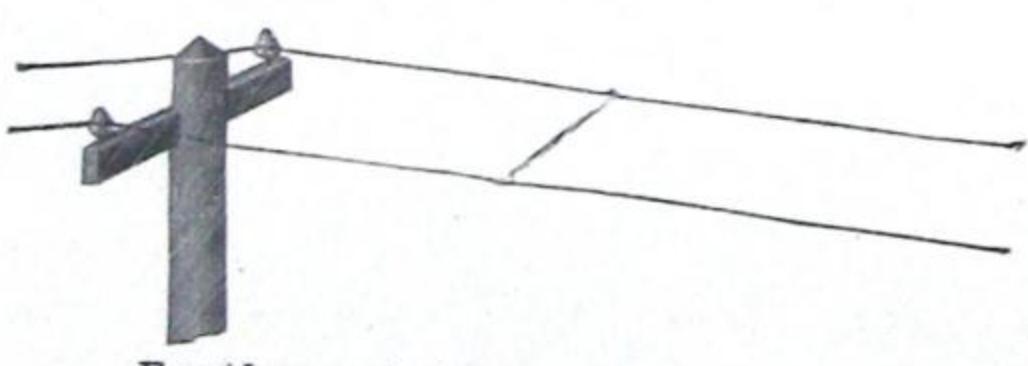
Grip Arm



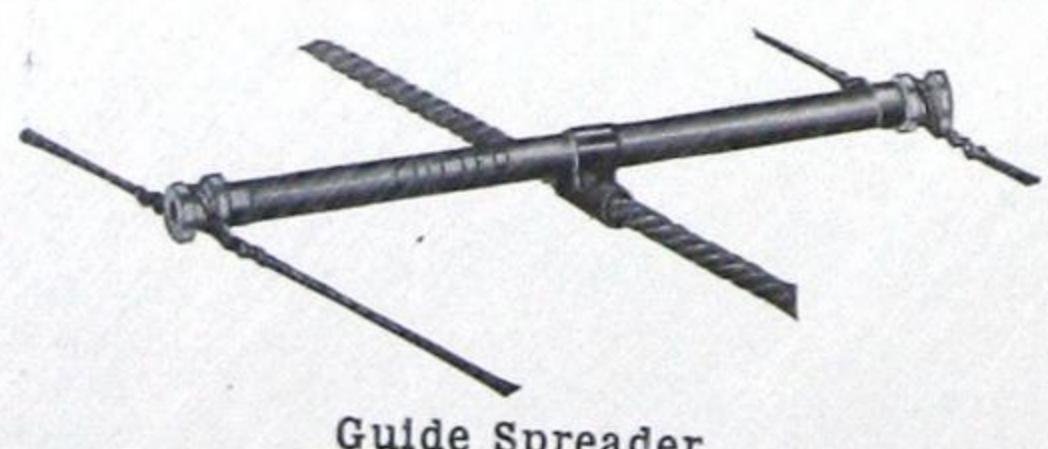
Economy Arm



Featherweight Spreader



Featherweight Spreader in Use



Guide Spreader

## JUPITER CROSS-ARMS

An insulating cross-arm having both the wire supports and the lamp hook insulated from the support by Cutter Jupiter Insulator. The cross-arm is enameled and metal-bound and has deep grooved knobs at each end.

The ideal insulating arm for use on high voltage circuits.

Trade No.	Finish	Std. Pkg.	Wt., Lbs. Each	Price Each
20856	Enameled	50	7	\$1.80
20857	Galvanized*	50	7	2.05

## PLAIN ARMS

Enameled wood, with metal-bound ends and porcelain knobs. Holds the line wire 12 inches apart.

Trade No.	Std. Pkg.	Wt., Lbs. Each	Price Each
20862	200	1½	\$0.80

## GRIP ARMS

Consists of the plain arm with a "U" bolt for clamping same to 1½-inch (bore) iron piping as used on mast arms, outriggers and brackets.

Trade No.	Finish	Std. Pkg.	Wt., Lbs. Each	Price Each
20863	Enameled	200	1¾	\$0.40
20864	"U" bolt galvanized*	200	1¾	.45

## ECONOMY ARMS

A common sense cross-arm for use where the insulation is not important. Similar to the grip arm, but with sister hook.

Trade No.	Finish	Std. Pkg.	Wt., Lbs. Each	Price Each
22441	Enameled	200	2	\$0.50
22442	Iron parts galvanized*	200	2	.60

## FEATHERWEIGHT SPREADERS

Featherweight spreaders are readily fastened to the wires running to suspension lamps, so as to keep them at a distance of 18 inches from each other. Made of enameled wood, metal tipped, with porcelain insulators. Weighs less than 8 ounces.

Trade No.	Finish	Std. Pkg.	Wt., Lbs. Each	Price Each
20865	Enameled	200	¾	\$0.25

## GUIDE SPREADERS

Same as the above, with a collar to clasp the suspension cable. Keeps the line wires 18 inches apart and in line with the suspension strand.

Trade No.	Finish	Std. Pkg.	Wt., Lbs. Each	Price Each
20866	Enameled	200	1	\$0.40
20867	Collar galvanized	200	1	.45

\*Includes final coat of black enamel.

## CUTTER POLE LINE MATERIAL

## SCHEDULE F

## ROPE CLEATS

Strong and neat (though no cleat with its coil of rope makes as neat a job as the rope clamp and pole lock). Has the edges rounded so as not to cut the rope.



Rope Clamp

Chain Clamp

Trade No.	Finish	Std. Pkg.	Wt. Lbs.	Price Each
20871	Galvanized*	200	1	\$0.30

## ROPE CLAMPS

Made of malleable iron, will readily clamp any size rope up to  $\frac{3}{8}$ -inch, enabling the end of the hoisting rope to be locked at the pole. Can be used over and over again when the rope wears out.

20872	Painted	400	$\frac{1}{4}$	\$0.18
20873	Galvanized*	400	$\frac{1}{4}$	.22

## 1/2-INCH ROPE CLAMPS

Same as above, for  $\frac{1}{2}$ -inch ropes.

20874	Painted	400	$\frac{3}{4}$	\$0.20
20875	Galvanized*	400	$\frac{3}{4}$	.25

## CHAIN CLAMPS

A neat, secure fastening, enabling the end of the hoisting chain to be locked to the pole. Made for No. 1 or No. 3 Oneida Chain.

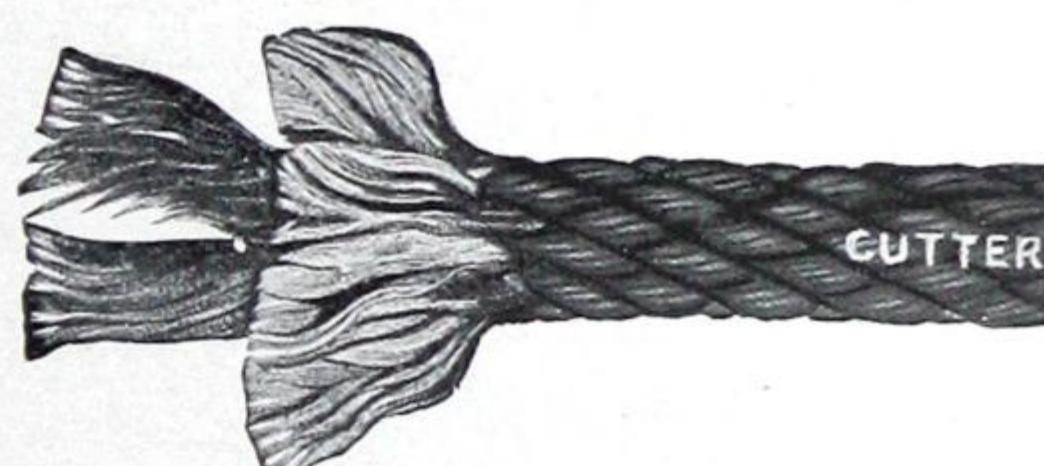
20876	Painted	400	$\frac{1}{2}$	\$0.18
20877	Galvanized*	400	$\frac{1}{2}$	.22

## ARC LAMP CORDAGE

## WEATHERPROOF LAMP ROPE

A fine braided cotton rope with a weatherproof finish, which keeps out the rain and makes it extra durable. We recommend the  $\frac{3}{8}$  and  $\frac{1}{2}$ -inch sizes for hoisting arc lamps, the  $\frac{1}{4}$  and  $\frac{5}{16}$ -inch for use with the swinging hoods and the  $\frac{3}{16}$ -inch for the Always Level Streethood.

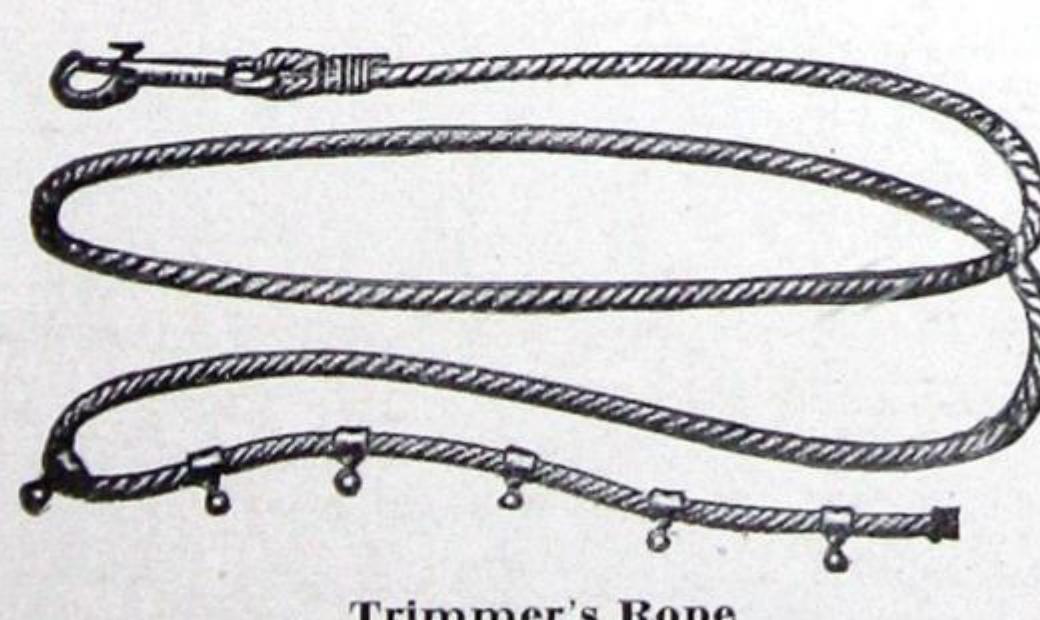
Trade No.	Size Inches	Wt., Lbs. Std. Pkg.	Approx. Wt., Lbs. per 100 Ft.	Price per Lb.
22340	$\frac{3}{16}$	100	2	\$1.05
22341	$\frac{1}{4}$	100	$2\frac{1}{2}$	1.05
22342	$\frac{5}{16}$	100	$3\frac{1}{8}$	1.05
22343	$\frac{3}{8}$	100	5	1.05
22344	$\frac{1}{2}$	100	8	1.05



Weatherproof Lamp Rope



Ebony Wire Rope



Trimmer's Rope

A  $\frac{1}{4}$ -inch wire rope made of six flexible strands (each with soft center) around a flexible (black) center. The only wire rope really pliable enough to work freely with standard types of pulleys.

Trade No.	No. of Feet in Std. Pkg.	Approx. Wt., Lbs. per 100 Ft.	Price per Ft.
20883	1000	5	\$0.09

\*Includes final coat black enamel.

## TRIMMER'S ROPE

Trimmer's rope is a 30-foot hoisting rope, with a snap hook at one end and six rings near the other end. The rings can be readily clamped at any desired intervals, so as to accommodate lamps hung at varying heights above the street. Just the thing for use with hoisting ropes, ending in a Cutter Rope Clamp and locked with a Cutter Pole Lock.

Trade No.	Std. Pkg.	Wt. Lbs.	Price Each
20884	25	4	\$2.50

\*Includes final coat black enamel.

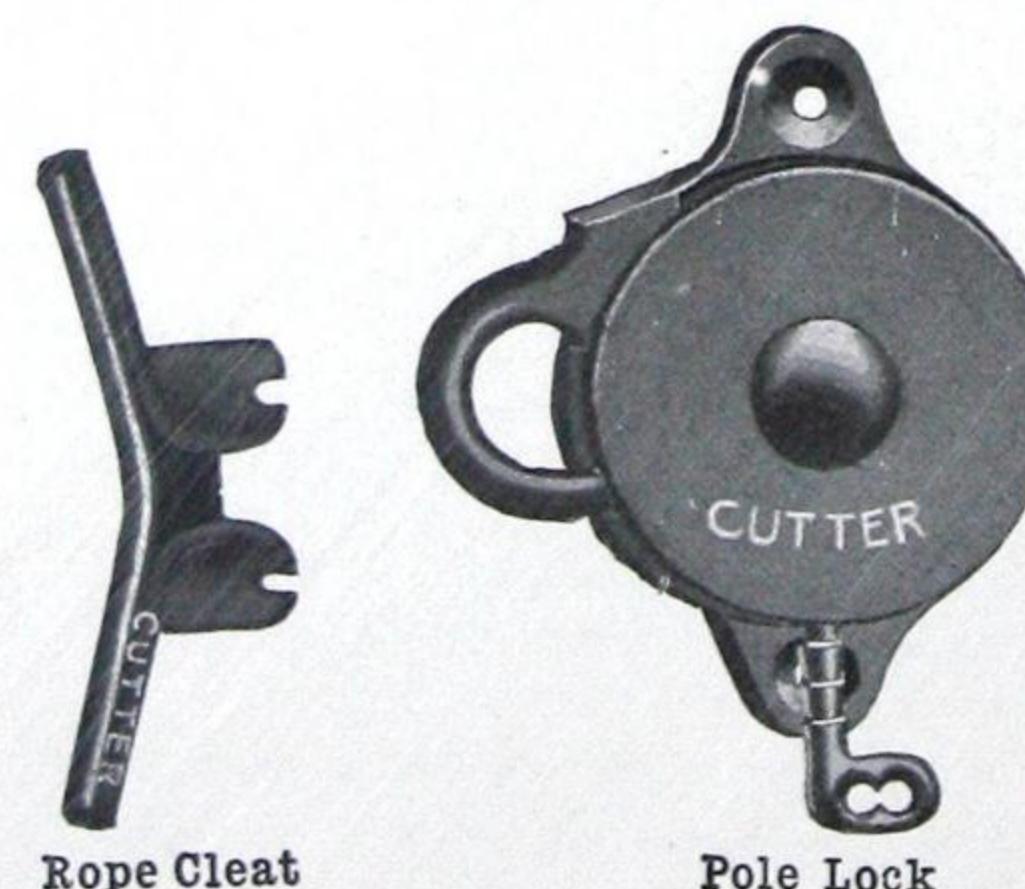
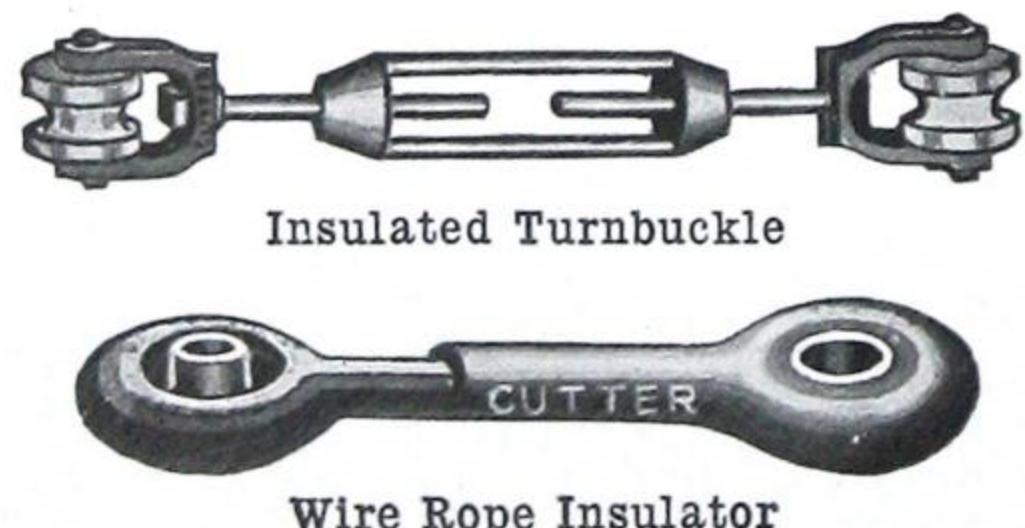
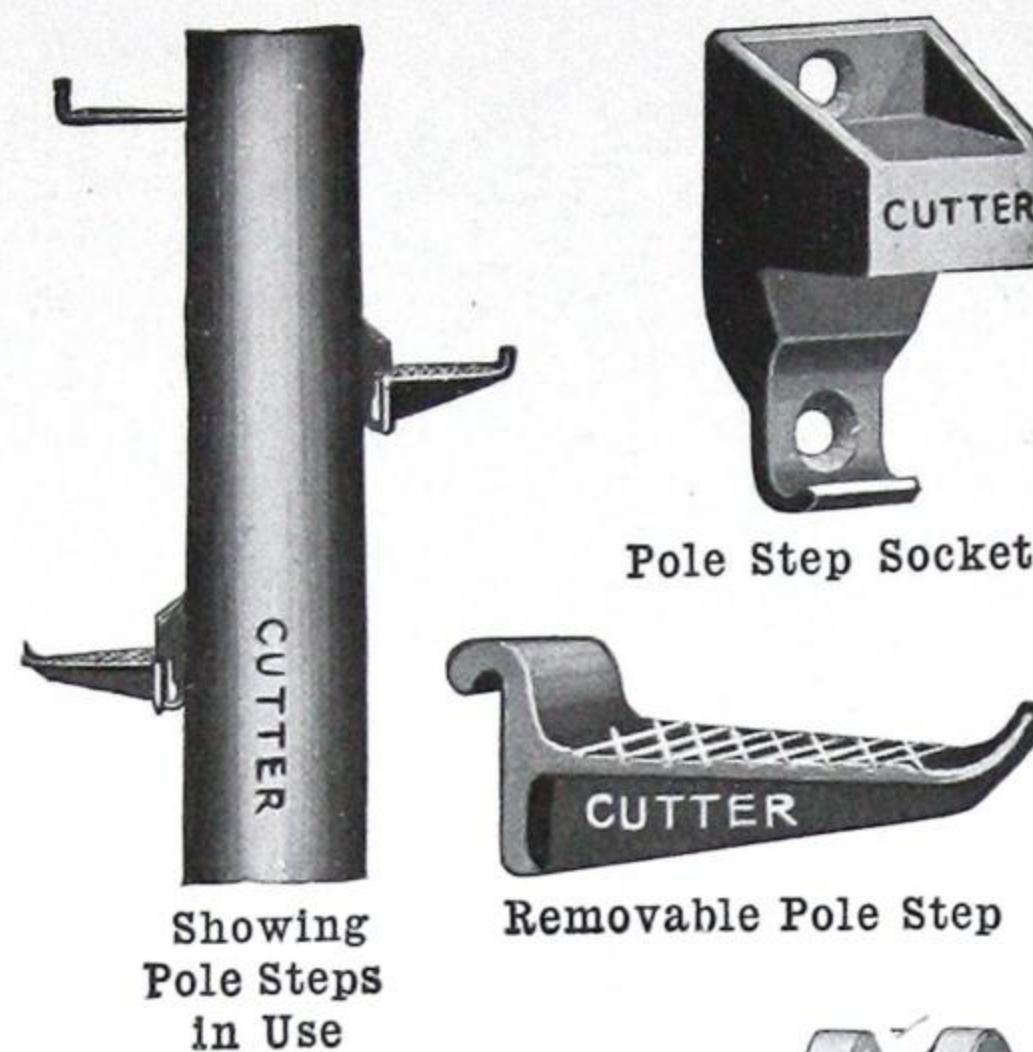
## CUTTER POLE LINE MATERIAL

## SCHEDULE F

## REMOVABLE POLE STEPS

Removable pole steps are much more easily carried than a ladder. A pair of them weighs less than 14 ounces, and can be slipped into the pocket. The sockets for them are hooded over so as to be sleet-proof.

Trade No.	Description	Std. Pkg.	Wt. Lbs.	Price Each
20885	Pole step, painted .....	250	7/8	\$0.25
20886	Socket, painted.....	250	7/8	.15
20887	Pole step, galvanized*..	250	7/8	.80
20888	Socket, galvanized*.....	250	7/8	.20



## ORNAMENTAL POLE STEPS

Ornamental pole steps fit either round or octagonal poles. They are fastened in place by using a single lag screw and a nail.

20889	Painted .....	250	1 1/8	\$0.15
20890	Galvanized .....	250	1 1/8	.25

## INSULATED FORKS

A wrought iron fork holds a heavy porcelain spool with  $1\frac{1}{8}$ -inch groove, which insulates the suspension wire or cable from the pole. Made for  $1\frac{1}{2}$ -inch lag screw. Prices do not include the lag screws.

20891	Painted .....	250	1	\$0.25
20892	Galvanized* .....	250	1	.30

## INSULATED SUSPENSION BOLTS

Consist of insulated fork with 12-inch bolt  $1\frac{1}{2}$  inch in diameter and having 6 inches of thread.

Shipped complete, with nut and washer.

20893	Painted .....	200	2	\$0.35
20894	Galvanized* .....	200	2	.45

## INSULATED TURNBUCKLES

An insulated fork on each end; maximum spread, 24 inches; adjustment, 9 inches.

20895	Painted .....	50	6	\$1.40
20896	Galvanized* .....	50	6	1.60

## WIRE ROPE INSULATORS

Wire rope insulators are looped into the hoisting rope just outside the pole pulley. Insulates the lamp end from the end within reach of the public. Made of steel, with hard rubber insulation and protecting ferrules.

20897	Eyes 4 inches apart.....	200	1/4	\$0.40
20898	Eyes 8 inches apart.....	200	7/8	.55

## POLE LOCKS

Has the keyhole at the bottom and not at the top (where the rain and sleet would drive into it). The double catch makes it non-pickable, the back fits either a wall or a pole, and the casting makes it weatherproof. Just the thing to prevent tampering with hoisting ropes. One key free with every ten locks.

Trade No.	Finish	Std. Pkg.	Wt. Lbs.	Price Each
20868	Painted	100	1 1/2	\$0.75
20869	Galvanized *	100	1 1/2	.85
20870	Extra key	25	1 oz.	.20

\*Includes final coat black enamel.

## CUTTER SOL-LUX INDUSTRIAL LIGHTING REFLECTORS

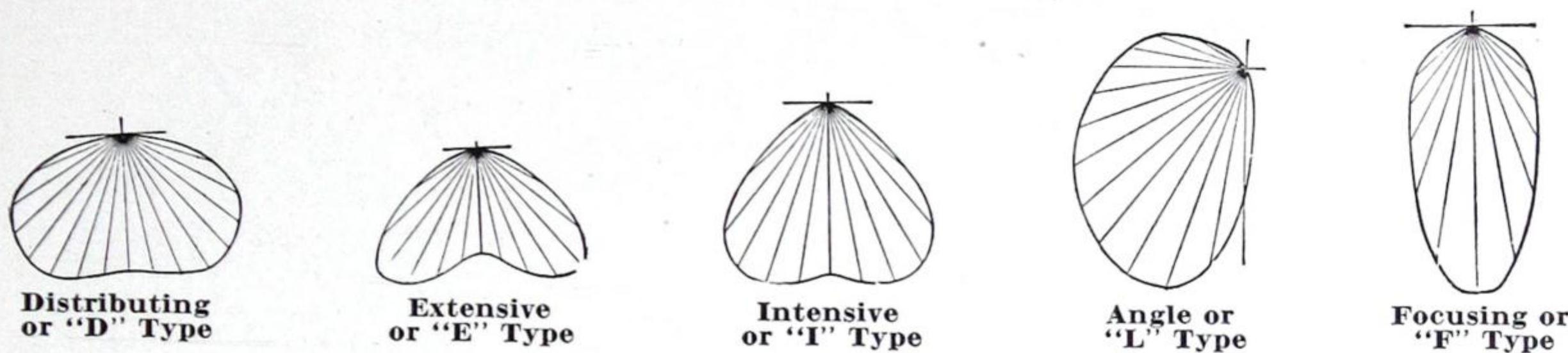
### SCHEDULE H—REQUIREMENTS FOR GOOD FACTORY LIGHTING

First.—Sufficient light of proper quality on the work. Second.—A moderate intensity of light over the adjacent area and on the walls. Third.—Absence of glare. Fourth.—A system that is simple, reliable, easy of maintenance and low in operating cost. By the use of Mazda C lamps and Cutter Sol-Lux reflectors, these results are obtained with the highest degree of success.

Factory lighting is of three general types:

- (1) General Illumination ("daylight" scheme), influenced by large lamps spaced to give uniform illumination throughout the plant.
- (2) Localized Lighting—lights over individual working planes.
- (3) Low General Illumination, supplemented by local lights.

Light distribution is an important consideration in planning a lighting installation. Characteristic curves are shown below.



The same relative results in illumination are obtained from the four types of reflectors if the same total wattage is used and the following ratios of mounting heights to outlet spacings are maintained.

#### MOUNTING HEIGHTS

"D" type,  $\frac{1}{3}$  the spacing of outlets; "E" type,  $\frac{1}{2}$  the spacing of outlets; "I" type,  $\frac{2}{3}$  the spacing of outlets; "F" type,  $1\frac{1}{2}$  times the spacing of outlets.

#### WATTAGE REQUIREMENTS

For low general illumination, use  $\frac{1}{2}$  watt for each square foot of floor space to be lighted—this for warehouse space, factory passages, foundries, assembling rooms, etc.

For average general illumination, use 1 to  $1\frac{1}{2}$  watts—this for ordinary demands. For a high degree of general illumination, use 2 to  $2\frac{1}{2}$  watts per square foot—this for fine bench work where details are very exacting.

#### TRADE NUMBER KEY

Trade numbers on reflectors consist of six digits.

The first digit represents finish—2 being used for enam-aluminum, 3 for porcelain enamel.

The second digit represents the holder, 2 being used for  $2\frac{1}{4}$ -inch standard heel, 3 for  $3\frac{1}{4}$ -inch standard heel.

The third digit represents the distribution—1 representing the extensive curve or Type E, 2 the intensive curve or Type I, 3 the distributing curve or Type D, 4 the angle distribution or Type L, 5 the focusing distribution or Type F.

The last three digits give the lamp size of the reflector, 000 being used for the 1000-watt size.

Example: 323100 3 = Porcelain enamel.  
2 =  $2\frac{1}{4}$ -inch standard heel.  
3 = Distributing curve distribution.  
100 = 100-watt Mazda lamp.

#### REFLECTOR FINISH

**Enam-Aluminum Finish** consists of three interior and two exterior coats. The interior final coat is a washable transparent enamel applied over a highly efficient matte aluminum surface. This gives a surface which will not hold the dust and which can be easily cleaned and brought to its initial efficiency.

**Porcelain Enamel Finish** consists of three coats of highest grade porcelain enamel.

## CUTTER SOL-LUX INDUSTRIAL LIGHTING REFLECTORS

## SCHEDULE H

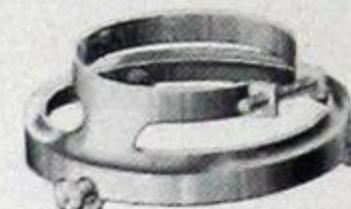
## REFLECTOR HOLDERS



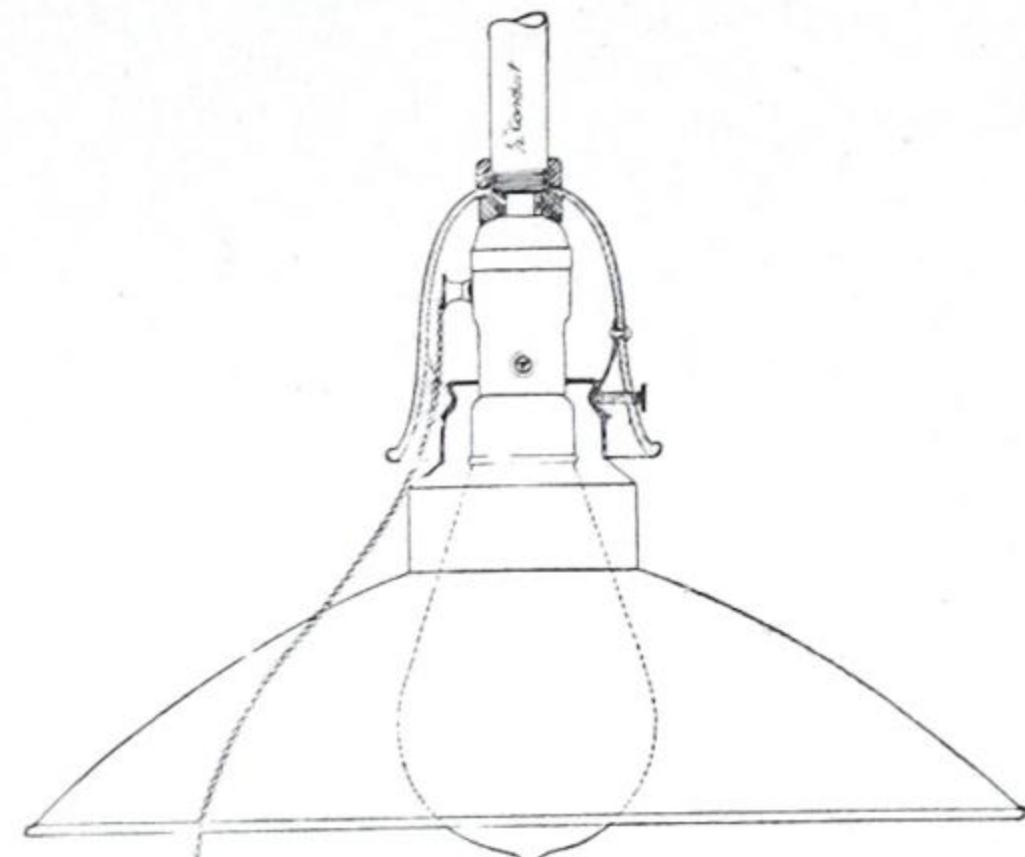
Standard 2 1/4 and 3 1/4-inch heel



2 1/4-inch Holder for Brass Shell Socket



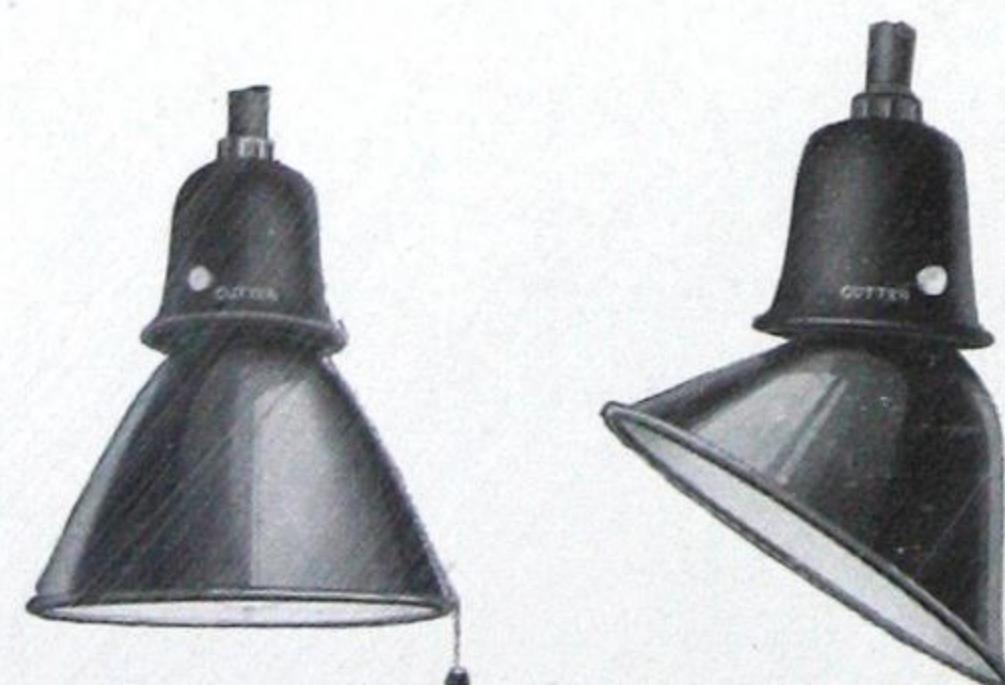
2 1/4-inch Holder for Porcelain Socket



Sectional View of 2 1/4-inch Universal Holder with Shurlok and Pull Chain Attachment



2 1/4-inch Universal Holder with Pull Chain Attachment and D Type Reflector No. 323200



2 1/4-inch Universal Holder with Pull Chain Attachment and I Type Reflector No. 322060

2 1/4-inch Universal Holder with L Type Reflector No. 324060

## 2 1/4-INCH SKELETON HOLDERS FOR MEDIUM SCREW SOCKETS

The 2 1/4-inch heel is supplied on reflectors for 200-watt lamps or smaller; the 3 1/4-inch heel on reflectors for 300-watt lamps and larger. All porcelain enameled reflectors have copper heels to prevent chipping of enamel. We recommend the use of Sol-Lux Universal Holders with various types of medium and Mogul sockets. Skeleton holders may be used with porcelain and brass sockets.

Trade No.	Description	Std. Pkg.	Wt. Lbs. Pkg.	Price Each
30500	For brass shell sockets...	144	7	\$0.10
30501	For porcelain sockets....	144	7	.14

## SOL-LUX UNIVERSAL HOLDERS

This new holder has been developed to take the place of the various styles of holders previously included in our line. It consists of a canopy with socket held in place by a special brass nut which screws directly on to 1/2-inch conduit. A conduit lock-nut locks the canopy in place. The reflector is locked in position by means of a thumbscrew. This holder is easily wired and when used with Shurlok Sockets gives absolute protection from loss of lamps.

The holder is made for both 2 1/4-inch and 3 1/4-inch standard heel reflectors listed on following page.

## 2 1/4-INCH UNIVERSAL HOLDERS WITH MEDIUM SCREW SOCKETS

30502	With keyless porcelain socket.....	20	48	1.00
30503	With pull chain socket...	20	45	1.70
30504	With Shurlok socket....	20	45	1.60
30505	With Shurlok and pull chain.....	20	45	2.00

## 3 1/4-INCH UNIVERSAL HOLDERS WITH MOGUL SCREW SOCKETS

30506	With porcelain socket...	10	30	1.50
30507	Same, with Shurlok attachment.....	10	30	2.20

## CUTTER SOL-LUX INDUSTRIAL LIGHTING REFLECTORS

## SCHEDULE H

## TYPE E, EXTENSIVE TYPE DISTRIBUTION

## Enam-aluminum Interior, Green Baked Paint Exterior

Trade No.	For Mazda Lamp Size	Diam. Inches	Depth Inches	Std. Pkg.	Wt., Lbs.	Price Pkg. Each
221060	25-40-60	7 1/4	5	50	40	\$0.76
221100	100	8 1/4	7 1/8	30	40	.92
221200	200	8 1/4	7 3/8	30	40	1.15



No. 331500

## \*Porcelain Enamel, White Interior, Green Exterior

321060	25-40-60	7 1/4	4 1/2	50	65	1.07
321100	100	8 1/4	6 5/8	30	60	1.32
321200	200	8 1/4	7 5/8	30	60	1.72
331500	300-400-500	12 1/4	7 1/2	20	70	2.90
331000	750-1000	15	10 3/4	10	75	3.80

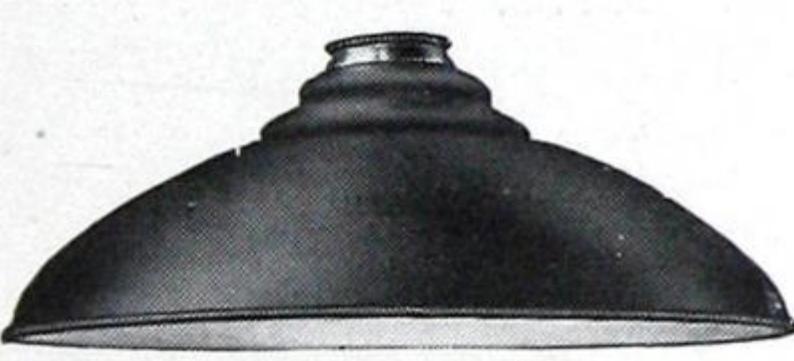


No. 222200

## TYPE I, INTENSIVE TYPE DISTRIBUTION

## Enam-aluminum Interior, Green Baked Paint Exterior

222060	25-40-60	7 1/4	5 1/8	50	40	.76
222100	100	8 1/4	7 1/4	30	40	.92
222200	200	8 1/4	7 3/4	30	40	1.15



No. 322200

## \*Porcelain Enamel, Green Outside, White Inside

322060	25-40-60	7 1/4	5 1/8	50	70	1.15
322100	100	8 1/4	7 1/2	30	70	1.75
322200	200	8 1/4	7 7/8	30	70	2.06
332500	300-400-500	12 1/4	8 5/8	20	80	3.10

## TYPE D, DISTRIBUTING OR BROAD DISTRIBUTION

## \*Porcelain Enamel, White Interior, Green Exterior

323060	25-40-60	12	4 1/4	20	90	1.55
323100	100	15	6 1/4	20	105	2.00
323200	200	15	6 1/4	20	105	2.00
333500	300-400-500	18	6 1/2	10	95	4.20
333000	750-1000	20	9 5/8	6	105	4.85



No. 323200

## TYPE L, ANGLE TYPE DISTRIBUTION

## Enam-aluminum Interior, Green Baked Paint Exterior

224040	25-40	6 5/8	5 3/8	50	35	.53
224060	60	8	6 5/8	30	35	.76
224100	100	10	9 1/8	30	40	1.20



No. 324200

## \*Porcelain Enamel, White Interior, Green Exterior

324040	25-40	6 5/8	5 3/8	50	60	1.23
324060	60	8	6 5/8	30	45	1.40
324200	100-200	10	8 3/4	30	70	2.00
334500	300-400-500	12 1/4	11 5/8	10	75	3.80
334000	750-1000	15	15 3/4	6	85	5.55



No. 225100

## TYPE F, FOCUSING TYPE DISTRIBUTION

## Enam-aluminum Interior, Green Baked Paint Exterior

225040	25-40	6 5/8	4 1/2	50	46	.54
225060	60	8	5 1/8	30	32	.82
225100	100	10	7 3/8	30	60	1.22

\* All porcelain enameled steel reflectors have copper heels which prevent chipping of the enamel when the reflectors are fastened to the holders.

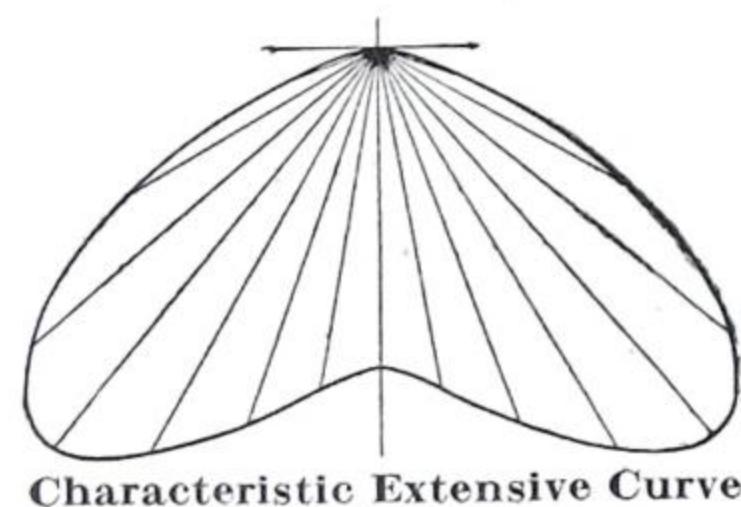
See preceding page for prices of Sol-lux Universal Holders

## CUTTER SOL-LUX INDUSTRIAL LIGHTING REFLECTORS

## SCHEDULE H



11-inch Deep Bowl  
One-piece Reflector Body  
(Extensive Type)



Characteristic Extensive Curve



11-inch Deep Bowl  
One-piece Reflector Body  
with Ventilation Cap  
and Lamp Guard



12-inch Shallow Bowl  
One-piece Reflector Body  
(Distributing Type)



Characteristic Type D Curve

## SOL-LUX ONE-PIECE REFLECTOR BODIES

Made in two types, deep bowl or extensive type and shallow bowl or distributing type. The deep bowl reflector body is ventilated for Type C lamps and can be used with ventilating cap for outdoor use. The shallow bowl reflector body is not ventilated as the socket parts reach a higher temperature in this type when ventilated than when not ventilated. The reverse is true of the deep bowl type.

These reflectors are easily wired and installed. The reflector body can be raised on the  $\frac{1}{2}$ -inch conduit stem at any time for inspection of wiring without disturbing socket or connections. This is easily done by loosening the  $\frac{1}{2}$ -inch conduit bushing.

Reflector bodies for 300, 400 and 500-watt lamps have Mogul Screw Sockets. All others have medium screw sockets.

## 7-in. Deep Bowl Reflector Body for 25, 40 and 60-watt Lamps

Trade No.	Description	Std. Pkg.	Wt. Lbs.	Price Each
30550	With keyless porcelain socket.....	20	45	\$2.25
30551	With pull chain socket.....	20	46	2.95
30552	With Shurlok socket.....	20	45	2.85
30553	With Shurlok and pull chain.....	20	46	3.25

## 8-in. Deep Bowl Reflector Body for 100-watt Lamps

30554	With keyless porcelain socket.....	20	50	2.40
30555	With pull chain socket.....	20	51	3.10
30556	With Shurlok socket.....	20	50	3.00
30557	With Shurlok and pull chain.....	20	51	3.40

## 9-in. Deep Bowl Reflector Body for 200 and 250-watt Lamps

30558	With keyless porcelain socket.....	20	70	2.50
30559	With pull chain socket.....	20	71	3.20
30560	With Shurlok socket.....	20	70	3.10
30561	With Shurlok and pull chain.....	20	71	3.50

## \*11-in. Deep Bowl Reflector Body for 300, 400 and 500-watt Lamps

30566	With keyless porcelain socket.....	10	55	3.70
30567	Same, with Shurlok attachment.....	10	56	4.40

## Ventilating Caps

30568	For deep bowl reflector bodies.....	20	10	.40
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## 12-in. Shallow Bowl Reflector Body for 25, 40 and 60-watt Lamps

30569	With keyless porcelain socket.....	20	100	2.70
30570	With pull chain socket.....	20	101	3.40
30571	With Shurlok socket.....	20	100	3.30
30572	With Shurlok and pull chain.....	20	101	3.70

## 14-in. Shallow Bowl Reflector Body for 100-watt Lamps

30573	With keyless porcelain socket.....	20	125	2.90
30574	With pull chain socket.....	20	126	3.60
30575	With Shurlok socket.....	20	125	3.50
30576	With Shurlok and pull chain.....	20	126	3.90

## 16-in. Shallow Bowl Reflector Body for 150, 200 and 250-watt Lamps

30577	With keyless porcelain socket.....	20	165	3.50
30578	With pull chain socket.....	20	166	4.20
30579	With Shurlok socket.....	20	165	4.10
30580	With Shurlok and pull chain.....	20	166	4.50

## \*18-in. Shallow Bowl Reflector Body for 300, 400 and 500-watt Lamps

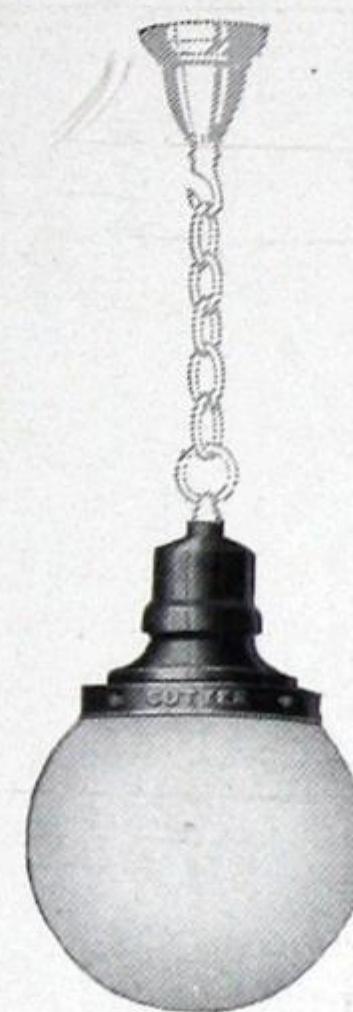
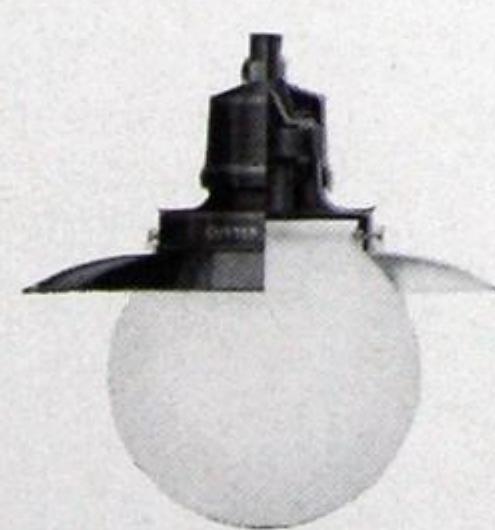
30585	With keyless porcelain socket.....	10	125	4.35
30586	Same, with Shurlok attachment.....	10	126	5.05

\*Furnished also with medium screw sockets for 200 and 250-watt lamps when so ordered.

## PENDENT LAMP GUARDS

Pendent lamp guards are made for attaching to lower rims of reflectors listed above and those of even diameters listed on previous page. Brass padlocks with two keys are 50 cents list additional.

Trade No.	Diam. In.	Std. Pkg.	Wt., lbs.	Price Each	Trade No.	Diam. In.	Std. Pkg.	Wt., lbs.	Price Each
30587	7	20	15	\$1.05	30592	12	20	25	\$1.55
30588	8	20	18	1.15	30593	14	20	30	1.65
30589	9	20	20	1.25	30594	15	20	32	2.10
30590	10	20	22	1.35	30595	16	20	35	2.40
30591	11	20	23	1.45	30596	18	20	40	2.90

8-inch  
Copper Holder  
with 12-inch  
Opal Globe6-inch  
Copper Holder  
with 8-inch  
Stalactite8-inch  
Copper Holder  
with Globe  
(Showing Chain  
Suspension)6-inch  
Copper Holder  
with Stalactite  
(Showing Chain  
Suspension)6-inch  
Copper Holder  
with 15-inch  
Reflector and  
Stalactite  
(Showing Stem  
Suspension)6-inch  
Copper Holder  
and  
Stalactite  
(Showing  
Stem  
Suspension)Sectional View  
6-inch Universal  
Globe Holder with  
ReflectorInsulated  
Suspension  
Ring

## CUTTER SOL-LUX FIXTURES

### FOR TYPE C LAMPS—PENDENT STYLES

Schedule H—Standard Package Quantity, 20 of  
One Style or Trade Number

Sol-lux Holders with and without glassware and suspension parts for making complete Fixtures listed separately below.

For 500-watt or smaller Type C lamps, use 6x10-inch opal globe or 6x8-inch stalactite; for larger lamps, use 8x12-inch opal globe.

### SOL-LUX COPPER HOLDERS

Have gun metal finished copper holders for reflectors or globes, lamp grip sockets, ventilated copper hoods and iron supports threaded for  $\frac{1}{2}$ -inch pipe.

Description	Wt., Lbs. Each	Medium		Mogul	
		Trade No.	Price Each	Trade No.	Price Each
6-in. copper holder . . . . .	3 $\frac{1}{4}$	30013	3.15	30014	3.35
6-in. copper holder with 10-in. opal globe . . . . .	10 $\frac{3}{4}$	30017	4.90	30018	5.10
6-in. copper holder with 8-in. opal Stalactite . . . . .	10 $\frac{1}{4}$	30019	4.40	30020	4.60
8-in. copper holder . . . . .	3 $\frac{1}{2}$	30015	3.35	30016	3.55
8-in. copper holder with 12-in. opal globe . . . . .	13	30021	5.35	30022	5.55
6x15-in. reflector . . . . .	7	30518	1.25	List Extra	
8x18-in. reflector . . . . .	8	30519	2.00	List Extra	

Chain or stem suspension parts extra as listed below.

### SOL-LUX 6-INCH AND 8-INCH UNIVERSAL HOLDERS

Made of cast iron, of light but substantial construction. Galvanized and finished in black paint enamel so they will not corrode. Threaded in top for  $\frac{1}{2}$ -inch pipe and ventilated.

6-in. holder . . . . .	8	30520	1.90	30521	2.10
8-in. holder . . . . .	9	30522	2.10	30523	2.30

### SOL-LUX UNIVERSAL HOLDERS WITH GLOBE AND 15-IN. AND 18-IN. PORCELAIN ENAMELED REFLECTORS

6-in. holder with 10-in. opal globe only . . . . .	15 $\frac{1}{2}$	30524	3.65	30525	3.85
6-in. holder with 15-in. reflector and 10-in. opal globe . . . . .	18 $\frac{1}{2}$	30526	4.90	30527	5.10
6-in. holder with 15-in. reflector and 8-in. Stalactite . . . . .	18	30528	4.40	30529	4.60
8-in. holder with 12-in. opal globe only . . . . .	18 $\frac{1}{2}$	30530	4.10	30531	4.30
8-in. holder with 18-in. reflector and 12-in. opal globe . . . . .	21 $\frac{1}{2}$	30532	6.10	30533	6.30

Chain or stem suspension parts extra as listed below.

### SUSPENSION PARTS

For convenience in making up various combinations of parts for complete fixtures, the suspension parts listed below may be used with any of the holders listed above.

### INSULATED SUSPENSION RINGS

Made of cast iron, finished in black paint enamel or galvanized. Has porcelain bushings for wires and a suspension ring insulated from the hanger proper. Threaded for  $\frac{1}{2}$ -inch pipe.

Trade No.	Description	Wt., Lbs. Each	Price Each
30029	Paint enameled . . . . .	1 $\frac{1}{2}$	\$0.70
30030	Galvanized . . . . .	1 $\frac{1}{2}$	.80

### STEMS AND CHAINS—GUN METAL FINISH

#### Stems, 18-inch Drop, Including Canopy and Wiring

30031	With crowfoot . . . . .	6	2.20
30032	With $\frac{3}{8}$ -inch hickey . . . . .	6	2.10
30033	With $\frac{3}{8}$ -inch insulating joint . . . . .	6	2.50

#### Chain, 18-inch Drop, Including Canopy and Wiring

30034	With crowfoot . . . . .	4	2.70
30035	With $\frac{3}{8}$ -inch hickey . . . . .	4	2.60
30036	With $\frac{3}{8}$ -inch insulating joint . . . . .	4	3.10

$\frac{1}{2}$ -in. hiccyes and insulating joints furnished in place of  $\frac{3}{8}$ -in. when so ordered, at same price. Longer lengths of either stem or chain suspension, 50 cents per ft. list additional.

## CUTTER SOL-LUX FIXTURES

## FOR TYPE C LAMPS—BRACKET STYLES

Schedule H—Standard Package Quantity, 20 of One  
Style or Trade Number

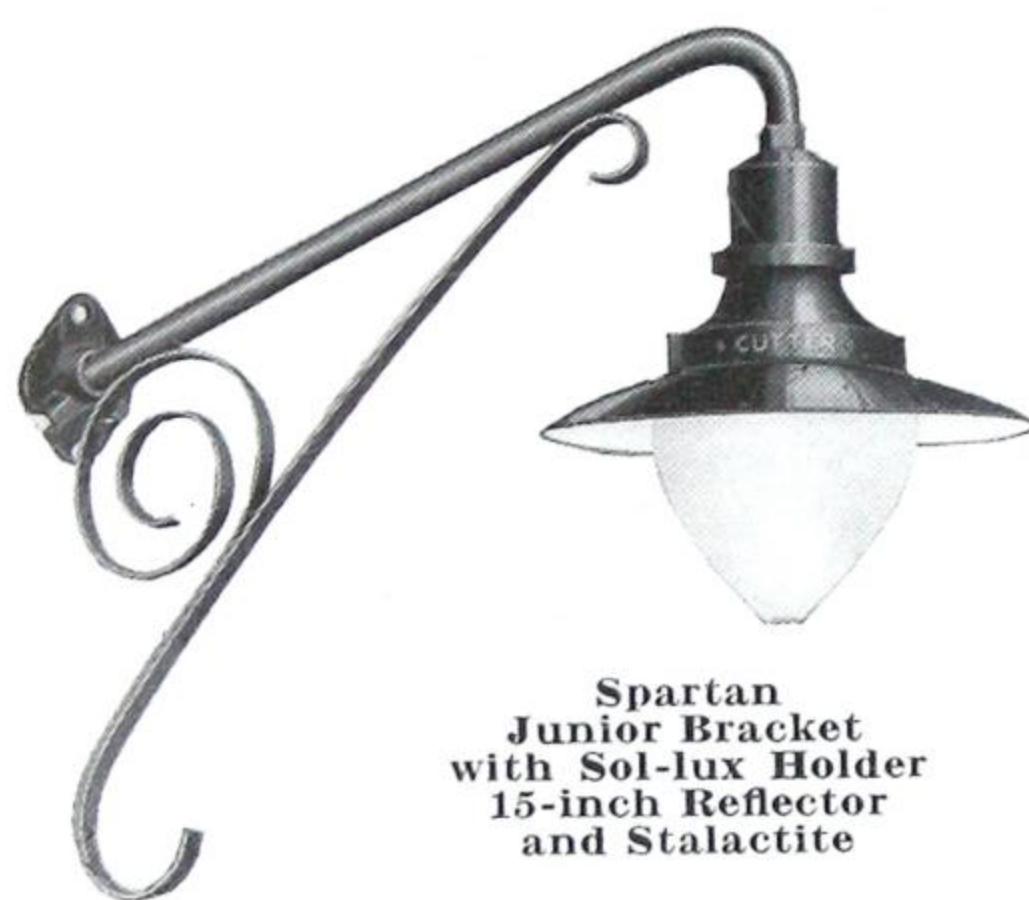
For 500-watt or smaller Type C lamps, use 6 x 10-inch opal globe or 6 x 8-inch Stalactite; for larger lamps, use 8 x 12-inch opal globe or Acorn Diffuser.

STANDARD BRACKETS WITH SOL-LUX  
HOLDERS

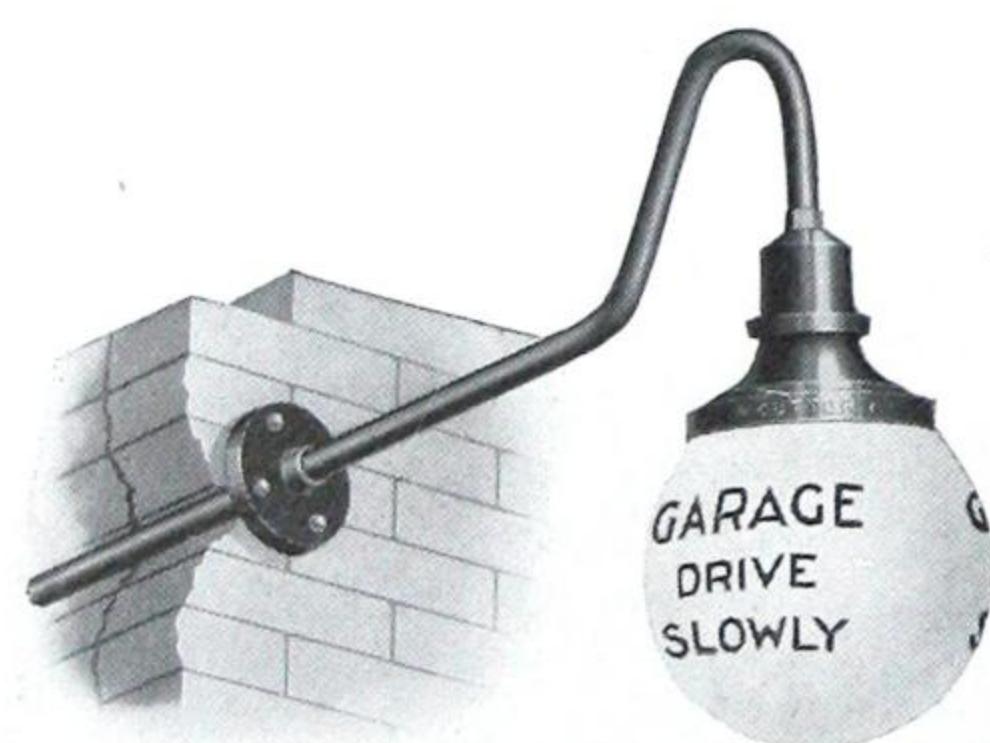
A simple form of bracket suspension, consisting of a 3-foot gooseneck of  $\frac{1}{2}$ -inch pipe, with grooved wall plate, for inner wiring. The Sol-lux Holder attached to the outer end is made of copper with gun metal finish. Furnished with Cutter Grip Sockets, but not wired.



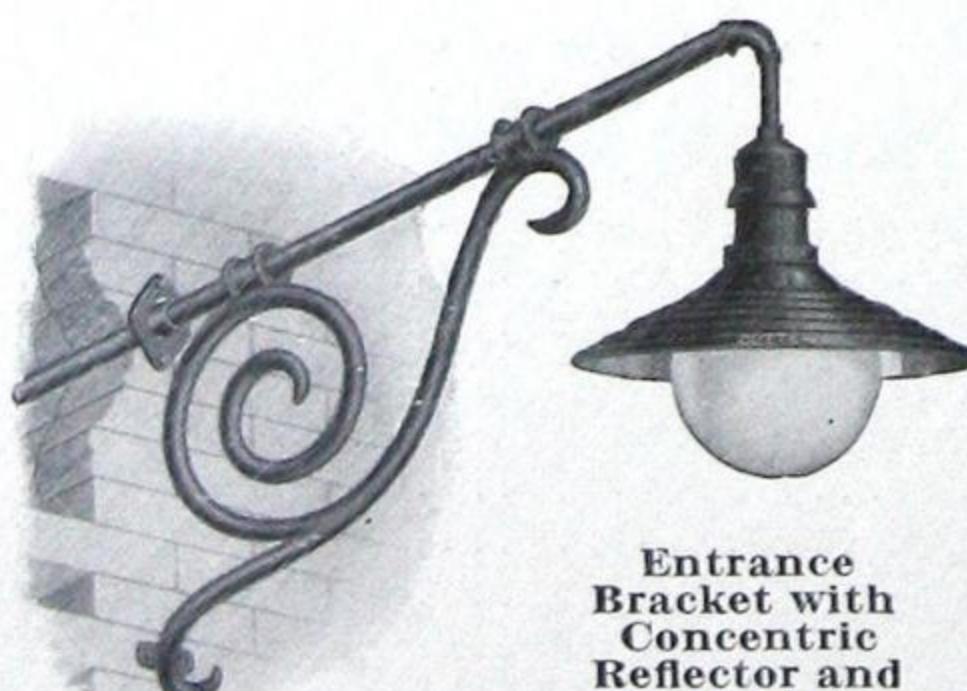
Standard  
Bracket with  
Sol-lux Holder  
and Opal Globe



Spartan  
Junior Bracket  
with Sol-lux Holder  
15-inch Reflector  
and Stalactite



Wall Bracket with  
Sol-lux Holder and  
Opal Globe



Entrance  
Bracket with  
Concentric  
Reflector and  
Opal Globe

Description	Wt., Lbs. Each	Med. Screw Skt.		Mogul Screw Skt.	
		Trade No.	Price Each	Trade No.	Price Each
6x10" opal globe.	15	30037	\$5.60	30038	\$5.80
6x8" Stalactite . .	15	30039	5.10	30040	5.30
8x12" opal globe.	17	30041	6.05	30042	6.25
6" holder only . . .	7	30043	3.85	30044	4.05
8" holder only . . .	7½	30045	4.05	30046	4.25

For galvanized gooseneck, add 20 cents list; for galvanized pole plate, add 10 cents list. For sign on globe of less than 20 letters, add \$1.50 list; for 20 or more letters, add \$3.00 list.

SPARTAN JUNIOR BRACKETS WITH  
SOL-LUX HOLDERS

An artistic and substantial bracket which holds the lamp 3 feet from the wall. Made of  $\frac{1}{2}$ -inch (bore) pipe, with wrought iron scrolls and grooved wall plate. The Sol-lux Holder is made of copper and supplied in gun metal finish. Shipped complete with Cutter Grip Sockets, but not wired.

6x10" opal globe.	23	30047	7.20	30048	7.40
6x8" Stalactite . .	23	30049	6.70	30050	6.90
8x12" opal globe.	25	30051	7.65	30052	7.85

For 6-inch Universal Holder, deduct \$1.25 from list with 6-inch Sol-lux Holder; for 8-inch Universal Holder, deduct \$1.25 from list with 8-inch Sol-lux Holder. For 6x15-inch reflector, add \$1.25 to list; for 8x18-inch reflector, add \$2.00.

For galvanized bracket, add 70 cents list. For sign on globe, add \$1.50 list for less than 20 letters; \$3.00 list for 20 or more

## WALL BRACKETS WITH SOL-LUX HOLDERS

Consists of a 4-foot gooseneck of  $\frac{1}{2}$ -inch pipe with wall flange, allowing the pipe to extend 1 foot inside the wall and 3 feet outside. Furnished complete, with Cutter Grip Socket, but not wired.

6x10" opal globe.	16	30057	6.00	30058	6.20
6x8" Stalactite . .	16	30059	5.50	30060	5.70
8x12" opal globe.	18	30061	6.45	30062	6.65
6" holder only . . .	8	30063	4.25	30064	4.45
8" holder only . . .	7½	30065	4.45	30066	4.65

For galvanized gooseneck, add 25 cents list; for galvanized wall flange, add 15 cents list. For sign on globe, add \$1.50 for less than 20 letters; \$3.00 list for 20 or more.

## ENTRANCE BRACKETS

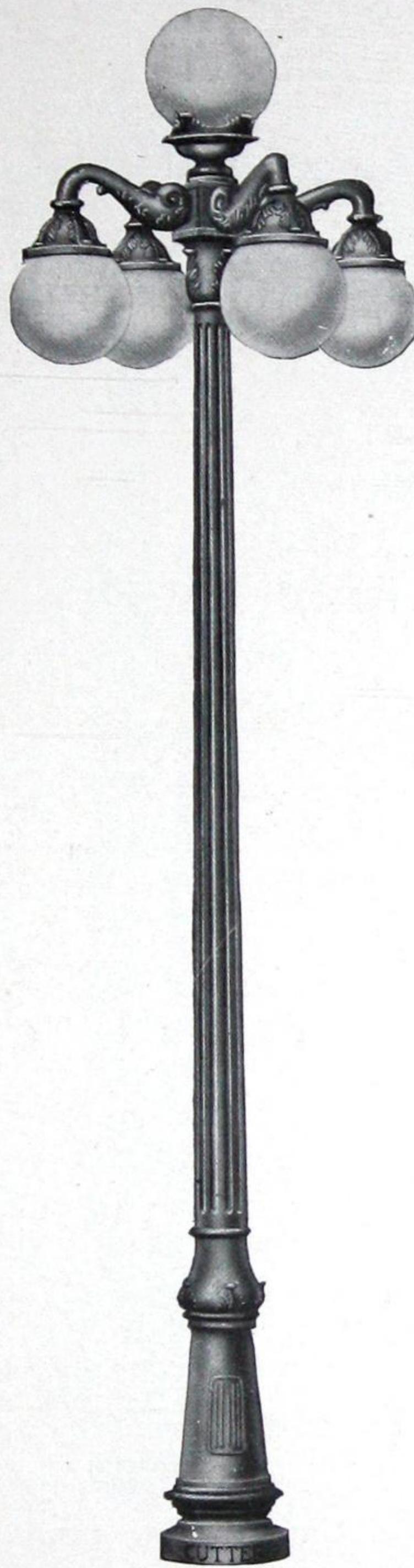
With Sol-lux Holder (4-inch Fitter) and 20-inch  
Concentric Dome Reflector

Consists of a 4-foot gooseneck of  $\frac{3}{4}$ -inch pipe, terminating in a vertical piece of  $\frac{1}{2}$ -inch pipe, which allows the hood to be raised for making connections. The wall flange slips over the pipe and fastens with a set screw.

8x12" opal globe.	37	30067	11.95	30068	12.15
4" holder only . . .	24	30071	6.25	30072	
Reflector, with- out globe . . . .	27	30073	8.85	30074	9.65
					4.50

For galvanized bracket, add \$1.00 list.

## CUTTER ORNAMENTAL POSTS

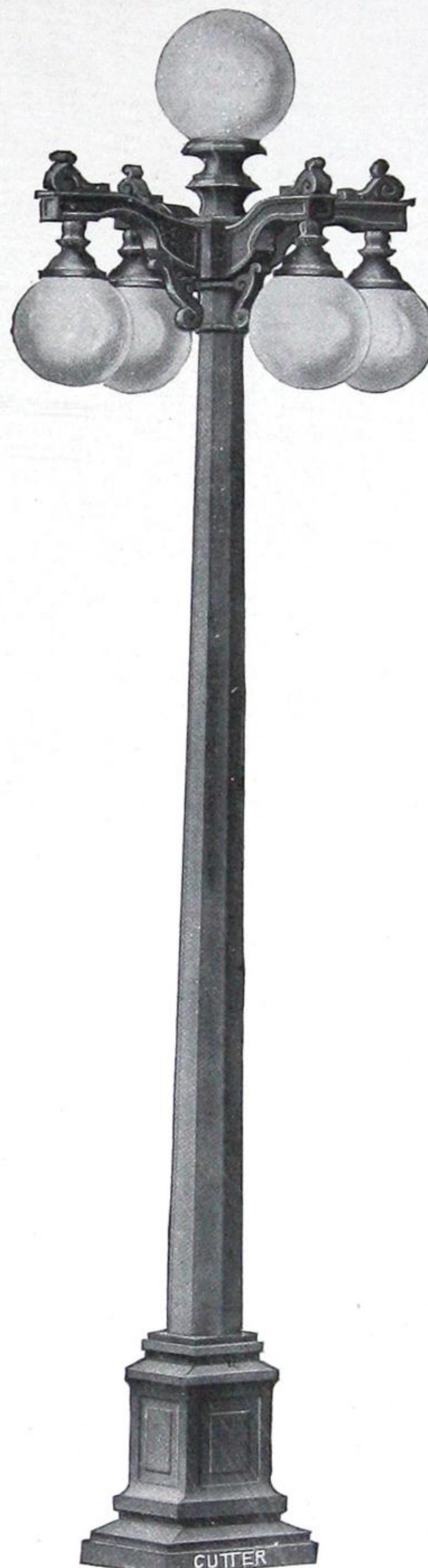
SCHEDULE I—Standard Package Quantity, 20 of One Style  
BOULEVARD COMMONWEALTH

No. 21121

Base, 14 inches diameter, 2 feet, 10 inches high. Column, 5½ inches diameter above the base, tapering to 3½ inches diameter near the top. Height, from ground to bottom of pendent globes, 10 feet; to top of top globe, 13 feet, 2 inches; to top of globe on the 1-light post, 12 feet, 7 inches. Distance from center to center of opposite globes, 32 inches. Pendent globes, 6x10 inches; top globe, 6x12 inches; globe for 1-light post, 8x14 inches. Use four ¾-inch foundation bolts.

Trade No.	No. of Lights	Std. Pkg.	Wt., Lbs. Each	Price Each
21117	1	20	300	\$35.00
21118	2	20	335	41.50
21119	3	20	335	41.50
21120	4	20	375	47.50
21121	5	20	375	47.50

Prices of posts include medium screw sockets but not the globes, wiring or foundation bolts.



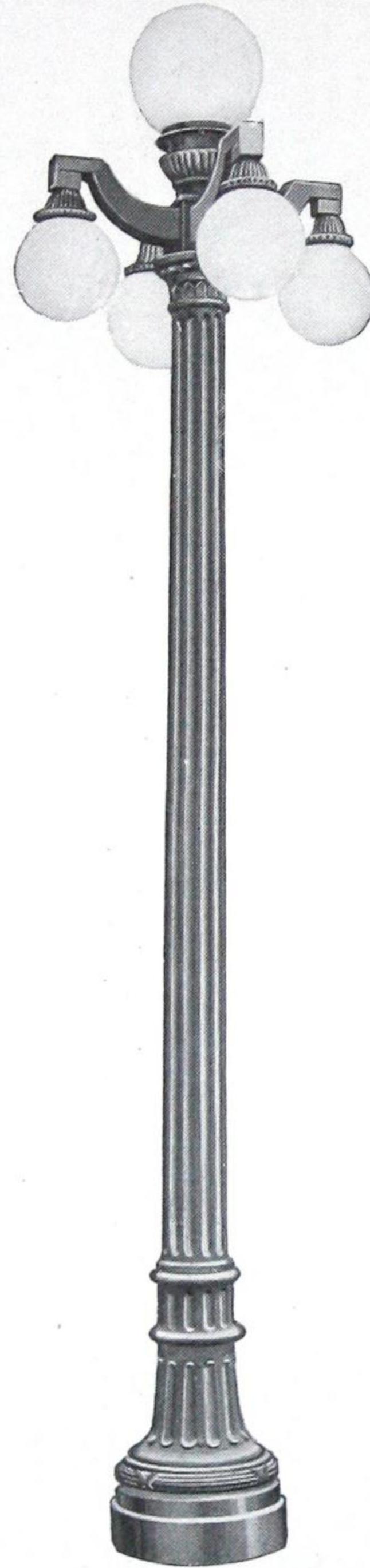
No. 23504

Base, 18 inches square, 2 feet high. Column, 8 inches octagon above the base, tapering to 4 inches octagon near the top. Height from ground to bottom of pendent globes, 11 feet; to top of top globe, 14 feet, 3 inches; to top of globe on the 1-light post, 13 feet, 6 inches. Distance from center to center of opposite globes, 36 inches. Pendent globes, 6x12 inches; top globe, 8x14 inches; globe for 1-light post, 8x16 inches. Use four 1-inch foundation bolts.

Trade No.	No. of Lights	Std. Pkg.	Wt., Lbs. Each	Price Each
23500	1	20	475	\$55.00
23501	2	20	560	60.00
23502	3	20	560	60.00
23503	4	20	665	65.00
23504	5	20	665	65.00

Prices of posts include medium screw sockets but not the globes, wiring or foundation bolts.

**CUTTER ORNAMENTAL POSTS**  
SCHEDULE I—Standard Package Quantity, 20 of One Style



Broadway, No. 23696

Base, 20 inches in diameter, 2 feet 8 inches high. Column, 7½ inches in diameter above the base, tapering to 6½ inches in diameter near the top. Height from ground to bottom of pendent globes, 11 feet 7½ inches; to top of center globe, 15 feet; to top of globe on 1-light post, 14 feet. Distance from center to center of opposite globes, 32 inches. Pendent globes, 6x12 inches; top globe, 8x16 inches. Globe for 1-light post, 8x16 inches. Use four 1-inch foundation bolts.

Trade No.	No. of Lights	Wt., Lbs. Each	Price Each
23692	1	560	\$56.50
23693	2	650	62.50
23694	3	650	62.50
23695	4	700	67.50
23696	5	700	67.50



Riverside, No. 21109

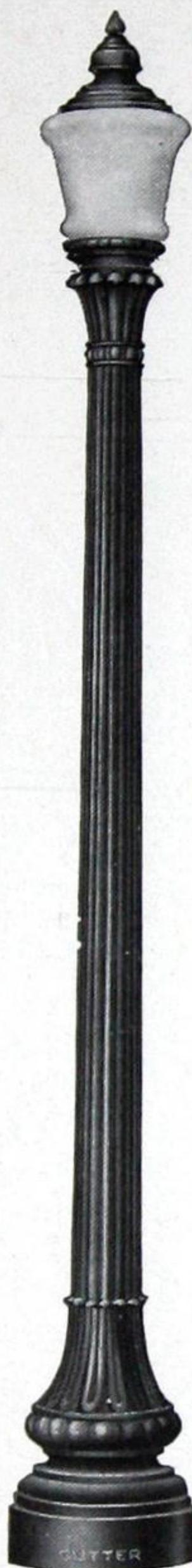
Base, 18 inches in diameter, 3 feet 6 inches high. Column, 8½ inches largest diameter, tapering to 3½ inches in diameter near the top. Height from ground to bottom of pendent globes, 11 feet; to top of top globe, 14 feet; to top of globe on the 1-light post, 13 feet 2 inches. Distance from center to center of opposite globes, 40 inches. All globes 8x12 inches, except for 1-light post, which is 8x16 inches.

Trade No.	No. of Lights	Wt., Lbs. Each	Price Each
21105	1	450	\$50.00
21106	2	500	55.00
21107	3	500	55.00
21108	4	585	60.00
21109	5	585	60.00

Prices of posts include medium screw sockets, but not the globes, wiring, or foundation bolts.

## CUTTER ORNAMENTAL POSTS

SCHEDULE I—STANDARD PACKAGE QUANTITY, 20 OF ONE STYLE  
 SINGLE LIGHT POSTS FOR TYPE C HIGH EFFICIENCY MAZDA LAMPS



Continental, No. 22055



Colony, No. 22065



Colony, No. 22068

The Continental Post is designed for "White Way" lighting, with Sol-lux Senior Top which accommodates compensators for 15 and 20-ampere series Mazda lamps. Base, 20 inches in diameter, 31 inches high. Column, 7½ inches in diameter above the base, tapering to 5¾ inches in diameter near the top. Height to bottom of globe, 12 feet 6 inches; to top of ventilator on Sol-lux Senior Globe, 14 feet 8 inches; to top of ventilator on 16-inch ball globe, 14 feet 4 inches. Globe holder has 8-inch fitter. Use four  $\frac{1}{8}$  or 1-inch foundation bolts.

The Colony Post is a smaller size of the Continental. Base, 16 inches in diameter, 21 inches high. Column, 5¾ inches in diameter above the base, tapering to 3¾ inches in diameter near the top. Height to bottom of globe, 10 feet; to top of ventilator on Sol-lux Junior Globe, 11 feet 11 inches; to top of ventilator on 16-inch globe, 11 feet 10 inches. Globe holder has 8-inch fitter and will accommodate compensator. Use three  $\frac{3}{4}$ -inch foundation bolts.

Description	Continental			Colony		
	Trade No.	Wt., Lbs. Each	Price Each	Trade No.	Wt., Lbs. Each	Price Each
* With globe holder and Mogul Screw Socket . . . . .	22051	560	\$52.80	22061	300	\$35.30
With Sol-lux Ornamental Top, Mogul Screw Socket	22055	580	70.80	22065	320	50.30
Same, with Regent Film Socket . . . . .	22056	581	71.80	22066	321	51.30
With 60-in. diffusing ball, ventilator and Mogul Socket	22058	580	63.30	22068	320	45.80
Same, with Regent Film Socket . . . . .	22059	581	64.30	22069	321	46.80

\*For prices of compensators, glassware, potheads, sockets and foundation bolts see pages following.

## CUTTER ORNAMENTAL POSTS

SCHEDULE I—Standard Package Quantity, 20 of One Style

SINGLE LIGHT POSTS FOR TYPE C HIGH EFFICIENCY MAZDA LAMPS



Arcadian with Octagonal Senior Top and Extension Capitol

Arcadian No. 23160 with Octagonal Senior Globe

Suburban with Sol-lux Junior Top and Extension Capitol

The Arcadian Post is an original design of simple elegance embodying the latest ideas of art. It is adapted to either business or residence districts of all cities and towns.

Made in two sizes designated Arcadian and Suburban, furnished with or without extension capitol. Senior tops are used with the Arcadian; Junior tops with Suburban. The bases are made in 20-inch and 16-inch octagons respectively. Height from ground to bottom of globe on the Arcadian Post, 12 feet; on Suburban, 10 feet. The extension capitol is made to receive compensators for 15 and 20 ampere lamps and adds 5½ inches to the height. Use 4¾-inch foundation bolts.

Description	Arcadian			Suburban		
	Trade No.	Wt. Each	Price Each	Trade No.	Wt. Each	Price Each
*With 8-inch globe holder and medium screw socket.....	23157	500	\$52.50	23164	350	\$40.00
Same, with Mogul Screw Socket.....	23158	501	52.80	23165	351	40.30
Same, with Regent Film Socket.....	23159	502	53.80	23166	352	41.30
With octagonal top, Mogul Socket.....	23160	526	70.80	23167	373	57.30
Same, with Regent Film Socket.....	23161	527	71.80	23168	374	58.30
With Sol-lux Top, Mogul Screw Socket.....	23162	521	70.80	23169	368	55.30
Same, with Regent Film Socket.....	23163	522	71.80	23170	369	56.30

Extension capitol for compensator coil furnished when so ordered for \$1.50 list additional.

\*Prices do not include glassware, compensators, wiring, lamps or foundation bolts.

## CUTTER ORNAMENTAL POSTS

SCHEDULE I—Standard Package Quantity, 20 of One Style

SINGLE LIGHT STANDARDS FOR TYPE C HIGH EFFICIENCY MAZDA LAMPS

Metropolitan, No. 22536  
With Octagonal Senior TopMetropolitan, No. 22538  
With Sol-lux Senior TopMetropolitan, No. 22540  
With 16-in. Diffusing  
Ball and Ventilator

The Metropolitan Post is designed for the lighting of business districts. It is octagonal in shape except the lower portion of the base which is square. Furnished with octagonal casing for compensator coils.

Base, 18 inches square, 3 feet high. Column, 6 $\frac{3}{4}$  inches, octagon above the base, tapering to 5 inches octagonal near the top. Height from ground to bottom of globe, 12 feet; to top of ventilator on octagonal globe, 14 feet 3 inches; to top of ventilator on Sol-lux Senior Globe, 14 feet 2 inches; to top of ventilator on 16-inch diffusing ball, 13 feet 7 inches. Use four  $\frac{3}{4}$ -inch foundation bolts.

Trade No.	Description	Wt., Lbs. Each	Price Each
22534	With 8-inch globe holder and Mogul Screw Socket.....	450	\$50.00
22535	Same, with Regent Film Socket.....	451	51.00
22536	With Octagonal Senior Top, Mogul Screw Socket.....	475	70.00
22537	Same, with Regent Film Socket.....	476	71.00
22538	With Sol-lux Senior Top, Mogul Screw Socket.....	470	68.00
22539	Same, with Regent Film Socket.....	471	69.00
22540	With 16-inch diffusing ball, ventilator, Mogul Socket.....	470	60.50
22541	Same, with Regent Film Socket.....	471	61.50

## CUTTER ORNAMENTAL POSTS

Schedule I—Standard Package Quantity, 20 of One Style

SINGLE-LIGHT POSTS FOR TYPE C HIGH EFFICIENCY MAZDA LAMPS



Capitol, No. 22075



Capitol, No. 22077



Capitol, No. 22078

The Capitol Post is a massive standard of highly artistic design built especially for the lighting of business districts with high candle power incandescent lamps. Base, 20 inches in diameter, 2 feet 5 inches high. Column, 7½ inches in diameter above the base, tapering to 6½ inches in diameter near the top.

It is made in two heights, 13 feet 5 inches and 11 feet 4 inches to bottom of Sol-Lux globe. The heights to top of ventilator on Sol-Lux Senior Globe are 15 feet 7 inches and 13 feet 6 inches, respectively.

Description	13-foot 5-inch Posts			11-foot 4-inch Posts		
	Trade No.	Wt., Lbs. Each	Price Each	Trade No.	Wt., Lbs. Each	Price Each
With Sol-Lux Ornamental Top, Mogul Socket.....	22075	600	\$78.30	22097	500	\$70.80
Same, with Regent Film Socket.....	22076	601	79.30	22098	501	71.80
With Octagonal Senior Top, Mogul Socket.....	22077	600	80.30	22084	500	72.80
Same with Regent Film Socket.....	22083	601	81.30	22087	501	73.80
With 16-inch diffusing ball, ventilator and Mogul Socket.....	22078	600	70.80	22099	500	63.30
Same, with Regent Film Socket.....	22079	601	71.80	22100	501	64.30

Use four 1-inch foundation bolts. For prices of bolts, compensators, etc., see pages 56 and 57.

## CUTTER ORNAMENTAL POSTS

Schedule I—Standard Package Quantity, 20 of One Style

SINGLE LIGHT POSTS FOR TYPE C HIGH EFFICIENCY MAZDA LAMPS



Broadway with Sol-Lux Senior Ornamental Top

Broadway with Octagonal Senior Globe

Broadway with 16-inch Diffusing Ball Ventilator

The Broadway Post is a massive standard of simple and artistic design. It is especially adapted to white way lighting in large cities. Base, 20 inches diameter, 2 feet 8 inches high. Column  $7\frac{1}{2}$  inches diameter above the base, tapering to  $6\frac{1}{8}$  inches diameter near the top. Height from ground to bottom of globe, 13 feet 6 inches; to top of ventilator on globe, 15 feet 9 inches. Sol-lux Senior casing will accommodate compensator and has an 8-inch globe fitter.

The Plaza Post is of the same design and dimensions as the Broadway, but shorter. Designed for white way lighting in small cities and towns and for residence districts of large cities. Height from ground to bottom of globe, 11 feet 6 inches; to top of ventilator, 13 feet 9 inches.

Description	Broadway			Plaza		
	Trade No.	Wt., lbs. Each	Price Each	Trade No.	Wt., lbs. Each	Price Each
With Sol-lux Senior Top, Mogul Socket.....	23763	600	\$75.80	23769	525	\$70.80
Same, with Regent Film Socket.....	23764	601	76.80	23770	526	71.80
With Octagonal Senior Top, Mogul Socket.....	23765	600	77.80	23771	525	72.80
Same, with Regent Film Socket.....	23766	601	78.80	23772	526	73.80
With 16-inch Diffusing Ball, Ventilator, Mogul Socket.....	23767	600	68.30	23773	525	63.30
Same, with Regent Film Socket.....	23768	601	69.30	23774	526	64.30

Use four 1-inch foundation bolts. For bolts, compensators, etc., see pages 56 and 57.

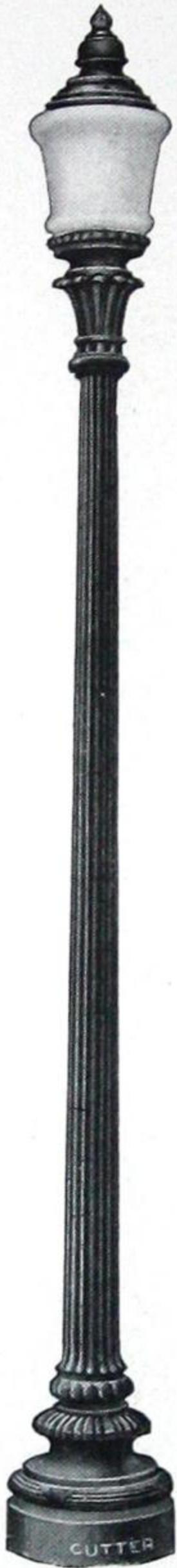
## CUTTER ORNAMENTAL POSTS

SCHEDULE I—Standard Package Quantity, 20 of One Style

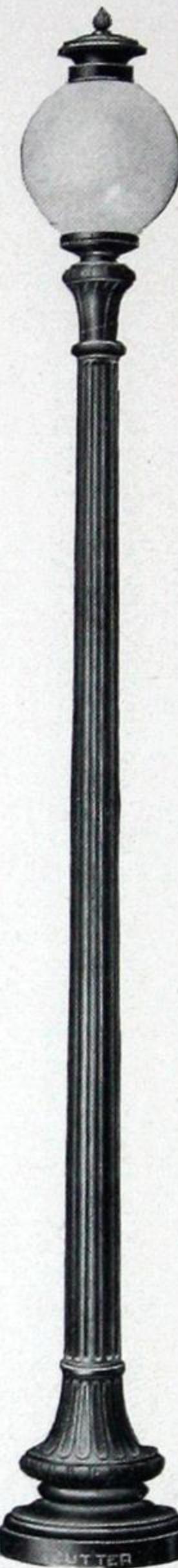
SINGLE-LIGHT STANDARDS FOR TYPE C HIGH EFFICIENCY MAZDA LAMPS



Park View, with 16-inch Diffusing Ball and Ventilator



Park View, with Sol-lux Junior Top



Villa, with 16-inch Diffusing Ball and Ventilator

The Park View Post is designed especially for lighting parks, boulevards and entrances to public buildings. Base, 16 inches in diameter, 17 inches high. Column, 5½ inches in diameter above the base, tapering to 3½ inches in diameter near the top. Height to top of standard globe holder, 10 feet; to bottom of Sol-lux Junior Globe, 10 feet 3½ inches; to top of ventilator on same, 12 feet 2½ inches; to top of ventilator on 16-inch ball globe, 12 feet.

The Villa design has a base 17 inches in diameter, 18¼ inches high. Column, 5 inches in diameter above the base, tapering to 2¾ inches in diameter near the top. Height to top of standard globe holder, 10 feet; to top of ventilator on 16-inch ball globe, 12 feet. Standard globe holder has 8-inch fitter.

Description	Park View			Villa		
	Trade No.	Lbs. Each	Price Each	Trade No.	Lbs. Each	Price Each
*With 8-in. standard globe holder and medium screw socket	22435	300	\$35.00	22426	300	\$35.00
*Same, with Mogul Screw Socket.....	22436	301	35.30	22427	301	35.30
*Same, with Regent Film Socket.....	22437	302	36.30	22428	302	36.30
With Sol-lux Junior Top, Mogul Socket.....	22431	312	51.00	.....	.....	.....
Same, with Regent Film Socket.....	22432	313	52.00	.....	.....	.....
With 16-inch diffusing ball, ventilator and Mogul Socket	22433	312	45.80	22429	312	45.80
Same, with Regent Film Socket.....	22434	313	46.80	22430	313	46.80

\* Glassware and ventilators extra. Use three ¾-inch foundation bolts. See pages following.

## CUTTER ORNAMENTAL POSTS

Schedule I—Standard Package Quantity, 20 of One Style  
 SINGLE-LIGHT STANDARDS FOR NOVALUX TOPS



These posts are designed for use with inverted arc lamps, but prices do not include arc lamps. The columns have threaded holes in the top to receive screws for holding the insulator of the arc lamp. The dimensions are practically the same for all posts, except that the White Way and Capitol styles are made in shorter lengths as designated.

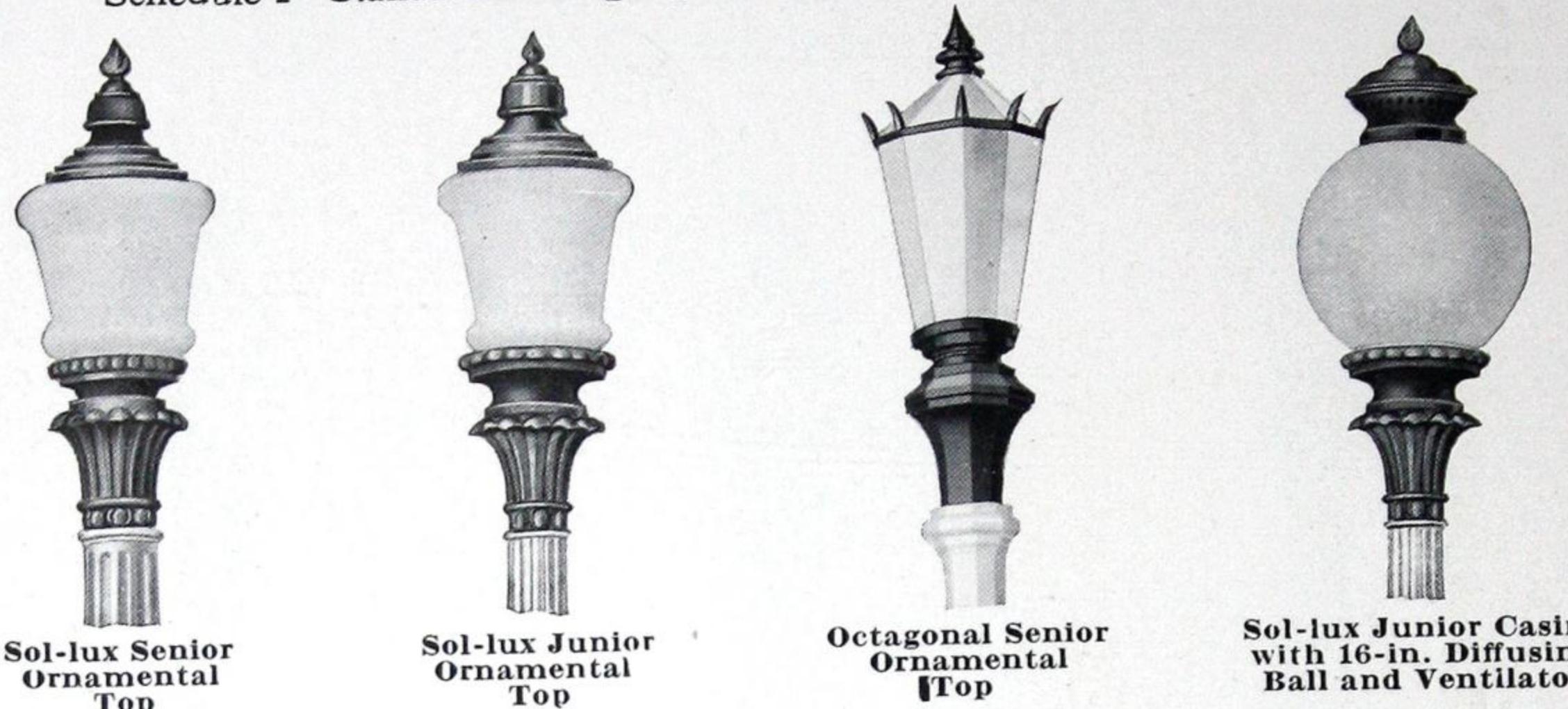
The bases are 20 inches in diameter and 2 feet 7 inches high. The columns are 7½ inches in diameter above the base, tapering to about 6 inches in diameter near the top. Height to bottom of inverted arc lamp, 12 feet 3 inches, except for Continental, which is 11 feet 5½ inches. Height to center of lamp of White Way type, 14 feet 6 inches; Residential, 12 feet.

Description	Ship. Wt., Lbs. Each	For Westinghouse Flame Lamp		For General Electric Novalux Top	
		Trade No.	Price Each	Trade No.	Price Each
Capitol, 14½ feet to lamp center.....	550	22090	\$52.50	22095	\$52.50
Capitol, 12 feet to lamp center.....	465	22070	45.00	22080	45.00
White Way.....	540	22091	50.00	22439	50.00
Residential.....	465	22092	45.00	22438	45.00
Continental.....	510	22094	47.50	22096	47.50

Use four 1-inch foundation bolts.

## PARTS FOR CUTTER ORNAMENTAL POSTS

Schedule I—Standard Package Quantity, 20 of One Style or Trade Number



## SOL-LUX ORNAMENTAL POST TOPS FOR TYPE C LAMPS

Made in two sizes, designated Senior and Junior respectively. The casings fit over cylindrical shanks  $3\frac{1}{2}$  inches in diameter and 5 inches high. Both have 8-inch globe fitters and accommodate compensators for 15 and 20-ampere Type C lamps. The Senior Casing is made for poles with columns about 6 inches in diameter near the top; Junior Casing, about  $3\frac{1}{2}$  inches. Sol-lux Senior Tops may be used on Capitol, Continental, Broadway and Plaza Columns; Junior Tops on Chicago, Avenue, Riverside, Boulevard, Midway and Park View Columns.

Deduct \$3.20 list from prices of 1-light posts for globe holder and medium screw socket and add prices of parts listed below.

Height of Senior Casing,  $14\frac{1}{4}$  inches; Junior Casing,  $14\frac{1}{4}$  inches. Height of Sol-lux Senior Globe,  $14\frac{3}{4}$  inches; Sol-lux Junior Globe, 13 inches. Height of Senior Ventilator, 12 inches; Junior, 10 inches. Ventilators are equipped with reflectors which direct the maximum amount of light into useful planes.

Description	Senior			Junior		
	Trade No.	Wt., Lbs. Each	Price Each	Trade No.	Wt., Lbs. Each	Price Each
Sol-lux Casing without socket*	22477	40	\$7.00	22481	38	\$5.00
Sol-lux High Efficiency Globe	22478	13	7.50	22482	11	6.00
Sol-lux Ventilator with reflector	22479	9	10.50	22483	8	9.00
Complete Sol-lux Top, less socket*	22480	62	25.00	22484	57	20.00

## OCTAGONAL POST TOPS FOR TYPE C LAMPS

Height of casing, 15 inches. Height to top of ventilator on Senior, 40 inches; on Junior, 36 inches. Casing has 8-inch globe fitter.

Description	Senior			Junior		
	Trade No.	Wt., Lbs. Each	Price Each	Trade No.	Wt., Lbs. Each	Price Each
Octagonal Casing	22463	50	\$10.00	22467	40	\$7.00
Octagonal Globe	22464	11	9.50	22468	9	7.50
Octagonal Trimming	22465	5	6.00	22469	4	5.00
Octagonal Ventilator	22466	9	4.50	22470	9	4.50

## DIFFUSING BALL GLOBES

Trade No.	Diam. In.	Size of Fitter, In.	Wt., Lbs. Each	Price Each	Trade No.	Diam. In.	Size of Fitter, In.	Wt., Lbs. Each	Price Each
21841	8	6	5	\$1.50	22488	14	7	14	\$3.50
21830	9	6	6	1.75	22489	14	8	14	3.50
21842	10	6	7	2.00	22490	16	8	18	6.50
21831	12	6	8	2.50	21791	16	8	6	18
22453	12	6	8	2.50	22492	18	8	26	9.00
22487	12	8	8	2.50	22493	20	8 $\frac{1}{4}$	36	25.00
22454	14	6	6	14	3.50	..	..	..	..

For globes with top fitters, order ventilators.

## VENTILATORS FOR DIFFUSING BALL GLOBES

Trade No.	Description	Wt., Lbs. Each	Price, Each
21792	For globe with 6-inch top fitter	9	\$4.00

## COMPENSATORS WITH MOGUL SOCKETS

Furnished with attachments for mounting in Sol-lux and Octagonal Post Tops.

Trade Number	For 6.6-amp.	For 7.5-amp.	Description	Wt., Lbs., Each	Price Each
22494	22497		For 400 candle power, 15-ampere lamp	7	\$10.80
22495	22498		For 600 candle power, 20-ampere lamp	9	11.80
22496	22499		For 1000 candle power, 20-ampere lamp	14	13.80

\* Add following list prices for sockets: Medium Screw, 50 cents; Mogul Screw, 80 cents; Regent Film, \$1.80. Compensators with Mogul Screw Sockets are listed separately. Diffusing ball globes and ventilators for same are listed above.

## PARTS FOR CUTTER ORNAMENTAL POSTS

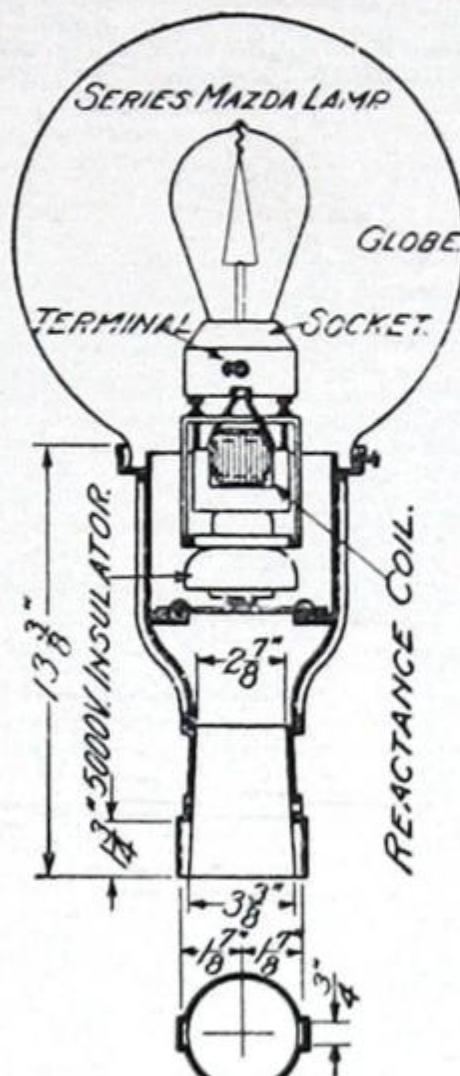
SCHEDULE I—Standard Package Quantity, 20 of One Style or Trade Number



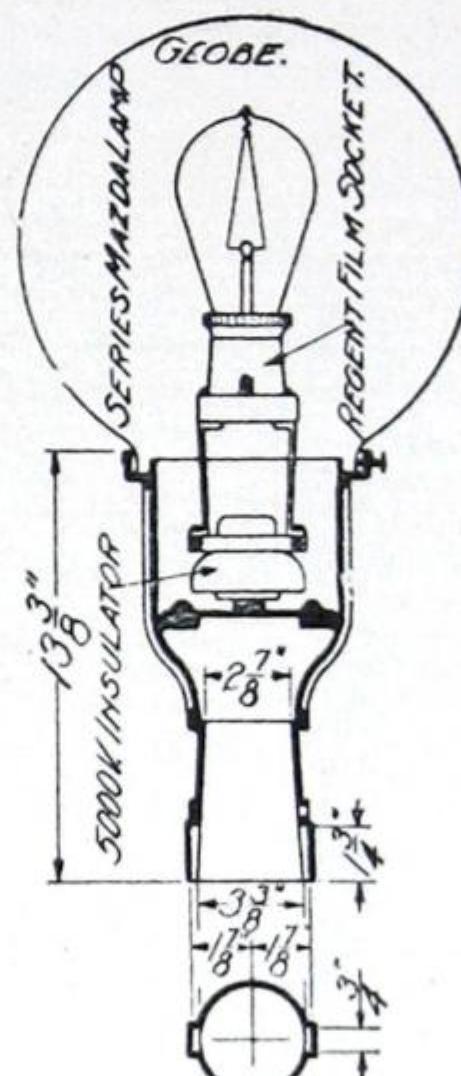
Gas Post with Head



Post Head with 7x14-in. Diffusing Ball



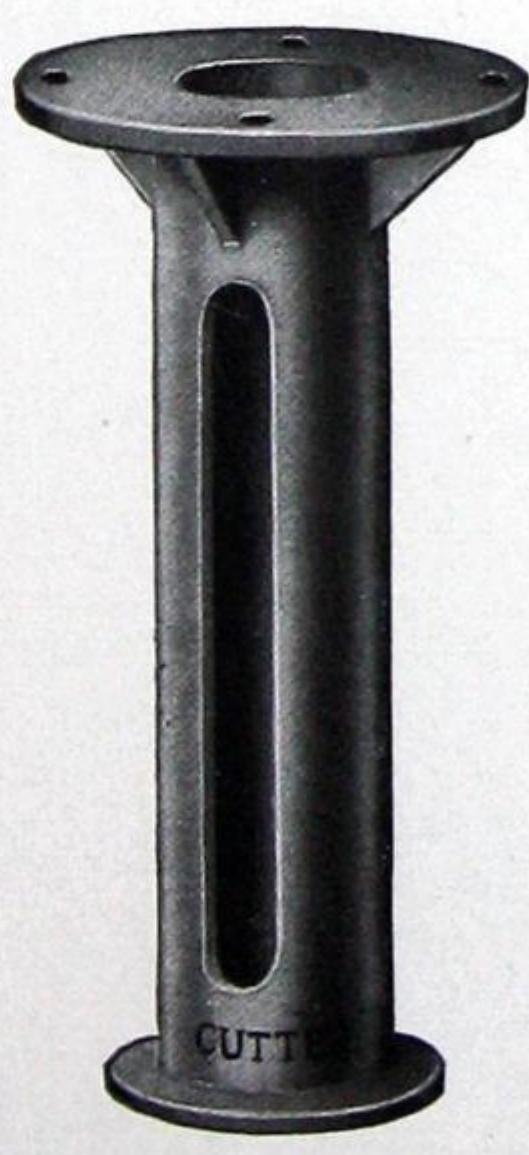
Post Head with Reactance Coil



Post Head with Regent Film Socket



Pothead



Cast Iron Ground Section

Designed for converting gas posts into electric light standards. Fits gas post columns or steel poles of  $2\frac{1}{2}$ -inch internal diameter. Equipped with Mogul Socket and Reactance Coil (for use on series circuits without regulator) or with Cutter Lamp Grip Multiple Sockets or Regent Film Socket. A high voltage insulator protects all live parts from grounds. Globe holder has 7-inch fitter. Prices do not include globes.

### With Reactance Coils and Mogul Sockets

Trade No.	Size of Lamp	Wt. C.P. Pounds	Price Each	Trade No.	Size of Lamp	Wt. C.P. Pounds	Price Each
4-amp. 60-cycle	6.6-amp. 60-cycle			4-amp. 60-cycle	6.6-amp. 60-cycle		
23051	23147	32	21	23054	23150	80	23
23052	23148	40	21 1/2	23055	23151	100	25
23053	23149	60	22	23056	23152	200	28

### With Sockets only

Medium Screw Socket	Mogul Screw Socket	Regent Film Socket
Trade Wt., Lbs. No. Each	Trade Wt., Lbs. No. Each	Trade Wt., Lbs. No. Each

23153 18 \$5.50

23154 19 \$5.80

23155 20 \$6.80

### POTHEADS

Has an iron bracket support for mounting in base of post. Provides a receptacle of high insulation where underground cables are connected to wires inside the post and hermetically sealed in. Cables are effectively grounded.

Trade No.	Description	Wt., Lbs. Each	Price Each
23156	In ordering, give external diameter of cables ...	10	\$ 3.00
23156A	Sealing compound for above (one pound for each), extra	.12	
23156B	Iron Support for Inbedding in concrete.....	5	.75

### GROUND SECTIONS

Prices of posts on preceding pages do not include foundation bolts as ground sections. When cast iron ground sections are used, bolts are used plied for fastening bases of posts to ground sections. Foundation bolts listed below.

21138	Commonwealth and Midway .....	225	16.00
21144	Broadway, Plaza, Capitol, Continental, White Way Residential, Park Way and Flaming Arc ..	225	16.00
21139	Avenue .....	225	16.00
21115	Chicago .....	225	16.00
21140	Riverside .....	160	13.00
21142	Park View and Colony .....	150	12.50
21116	Villa .....	160	13.00
21141	Boulevard .....	110	12.00

### FOUNDATION BOLTS

Prices cover round head machine bolts with hexagon nuts. Wrought washers are 10 per cent list extra.

#### Diameter of Bolts, and Price, Each

Length Bolt In.	$\frac{3}{4}$ -in.	$\frac{7}{8}$ -in.	1-in.	$1\frac{1}{4}$ -in.	Length Bolt In.	$\frac{3}{4}$ -in.	$\frac{7}{8}$ -in.	1-in.	$1\frac{1}{4}$ -in.
8	\$0.14	\$0.18	\$0.30	\$0.55	18	\$0.24	\$0.31	\$0.46	\$0.85
10	.16	.21	.32	.58	20	.....	.35	.50	.90
12	.18	.24	.36	.65	24	.....	.....	.58	1.00
15	.22	.28	.40	.75	..	.....	.....	.....	.....

## CUTTER ORNAMENTAL NEWELS FOR TYPE C LAMPS

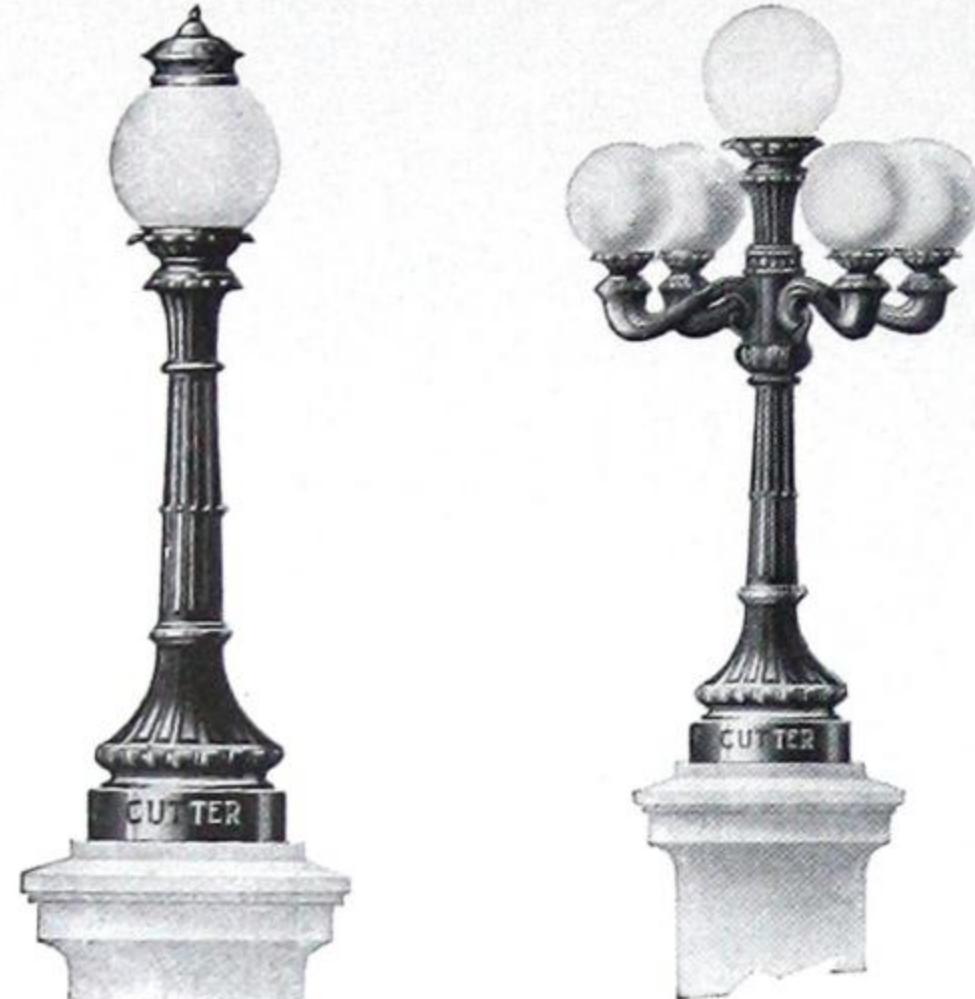
### Schedule I—Standard Package Quantity, 20 of One Style

#### SOL-LUX GATE POST NEWELS

These newels are made of the highest quality grey iron. They are of distinctive design and very appropriate for the lighting of gateways and private grounds, entrances of buildings, etc.

Base, 14 inches in diameter, 24 inches high. Column, 5 inches in diameter above base, tapering to  $3\frac{1}{2}$  inches in diameter near the top. Height from base plane to bottom of side globes, 3 feet 8 inches; to bottom of center globe, 4 feet  $6\frac{1}{2}$  inches; to bottom of globe of 1-light newel, 3 feet 8 inches. Distance from center to center of opposite globes, 30 inches. Designed for 6 x 9-inch or 6 x 10-inch side globes, and 6 x 12-inch or 6 x 14-inch top globe.

Prices below include medium screw sockets for side lamps and Mogul Screw Sockets for center lamps, unless otherwise specified. Prices do not include globes, ventilators, lamps, wiring or foundation bolts. Use three  $\frac{3}{4}$ -inch bolts.



Sol-Lux Gate Post Newels

Trade No.	No. of Lights	Wt., Lbs. Each	Price Each
21817	1	125	\$25.00
21818	2	175	35.00
21819	3	175	35.00
21820	4	215	40.00
21821	5	215	40.00

#### SOL-LUX BRIDGE NEWELS

Similar in design to Sol-Lux Gate Post Newel but higher. Base, 14 inches in diameter, 24 inches high. Column, 5 inches in diameter above the base, tapering to  $3\frac{1}{2}$  inches in diameter near the top. Height from base plane to bottom of side globes, 6 feet; to bottom of center globe, 6 feet  $10\frac{1}{2}$  inches to bottom of globe on the 1-light newel, 6 feet. Distance from center to center of opposite globes, 30 inches. Designed for 6x9-inch or 6 x 10-inch side globes and 6 x 12-inch or 6 x 14-in center globes.

Arms may be reversed for pendent clusters.

Prices below do not include globes, ventilators, lamps, wiring or foundation bolts. Use three  $\frac{3}{4}$ -inch bolts. Prices include medium screw sockets for side lamps and Mogul Screw Sockets for top lamps.

Trade No.	No. of Lights	Wt., Lbs. Each	Price Each
21825	1	175	\$32.50
21826	2	225	42.50
21827	3	225	42.50
21828	4	265	47.50
21829	5	265	47.50

#### GLOBES

Trade No.	Description	Wt., Lbs. Each	Price Each
21830	6x9-inch Diffusing Ball...	6	\$1.75
21842	6x10-inch Diffusing Ball...	7	2.00
21831	6x12-inch Diffusing Ball (without top fitter)...	8	2.50
22472	6x12-inch Diffusing Ball (with 6-inch top fitter)	8	2.50
22473	6x14-inch Diffusing Ball (with 6-inch top fitter)	9	3.50
21791	8x16-inch Diffusing Ball (with 6-inch top fitter)	10	6.50

#### VENTILATORS

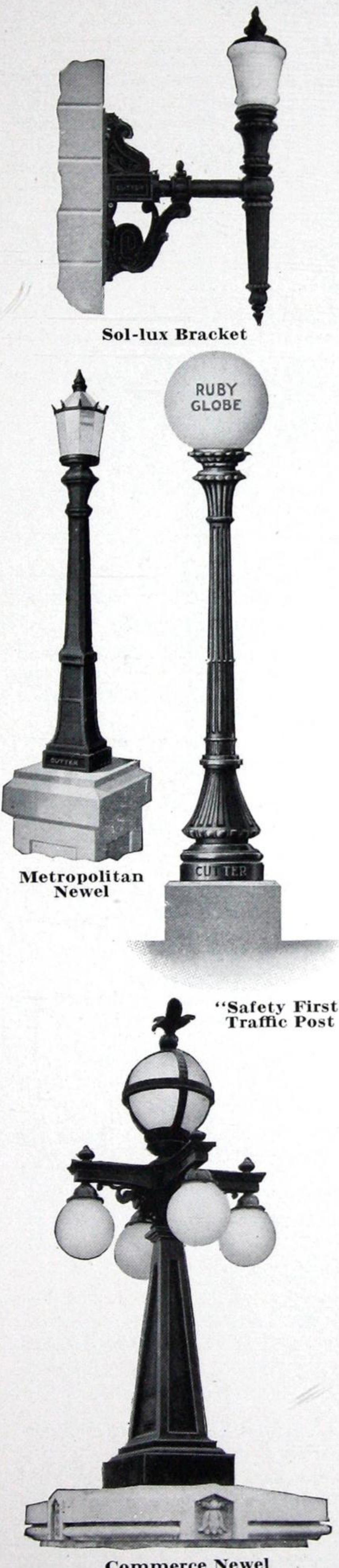
Trade No.	Description	Wt., Lbs. Each	Price Each
21792	With 6-inch fitter.....	9	\$4.00



Sol-Lux Bridge Newels

## CUTTER BRACKETS, NEWELS AND TRAFFIC POSTS

Schedule I—Standard Package Quantity, 20 of one Style



## SOL-LUX WALL BRACKETS

## For Type C Lamps

A massive bracket of highly artistic design. Wall plate, 2 feet high, 6 inches wide. Distance from wall to center of lamp, 3 feet. Height from bottom of shaft to top of ventilator on Sol-Lux Senior Globe, 6 feet 6½ inches.

Trade No.	Description	Ship. Wt., Lbs. Each	Price Each
22542	With Sol-lux senior top, Mogul Socket	375	\$68.00
22543	With oct. senior top, Mogul Socket...	380	70.00

For Verde antique finish, add \$5.00 list. For weatherproof bronze paint add \$10.00 list.

## METROPOLITAN NEWELS

A newel of simple but artistic design, adapted for lighting the entrances of buildings or for bridges and public places. Base 14 inches square, 2 feet high. Column 5 inches octagon above the base, tapering to 3½ inches octagon near the top. Height from base to bottom of globe, 7 feet; to top of ventilator on octagonal junior globe, 8 feet 9 inches. Globe holder has 8-inch fitter. Use four ¾-inch foundation bolts.

22548	With oct. junior top, med. screw socket	225	52.00
22549	Same, with Mogul Screw Socket.....	226	52.30
22550	Same, with Regent Film Socket.....	227	53.30
22566	With Sol-lux jun. top, med. screw socket	220	50.00
22554	Same, with Mogul Screw Socket.....	221	50.30
22555	Same, with Regent Film Socket.....	222	51.30

For Verde antique finish, add \$5.00 list; for weatherproof bronze paint, add \$10.00 list.

## "SAFETY FIRST" TRAFFIC POSTS

By marking the centers of intersecting streets the rule of "keep to the right" is always enforced. These traffic posts are silent watchmen, always on the job.

Base, 14 inches in diameter, 24 inches high. Column, 5 inches in diameter above the base, tapering to 3½ inches in diameter near the top. Height from base plane to bottom of globe on the 1-light newel, 6 feet.

Prices of newels do not include globes, lamps, wiring or foundation bolts. These are listed separately below.

27000	6-in. holder, medium multiple socket..	175	32.20
27001	8-in. holder, medium multiple socket..	176	32.20
21825	6-in. holder, Mogul Multiple Socket...	176	32.50
27003	8-in. holder, Mogul Multiple Socket...	177	32.50
27004	6-in. holder, Regent Film Socket.....	177	33.50
27005	8-in. holder, Regent Film Socket.....	178	33.50
27006	6x12-in. ruby globe, extra.....	8	8.00
27007	8x14-in. ruby globe, extra.....	9	12.00
21831	6x12-in. diffusing ball, extra.....	8	2.50
22489	8x14-in. diffusing ball, extra.....	9	3.50
	Set of three ¾x12-in. foundation bolts	...	.54
20938	Fixed pin clamp arm.....	6	.80
20942	Pinless clamp arm.....	6½	.80

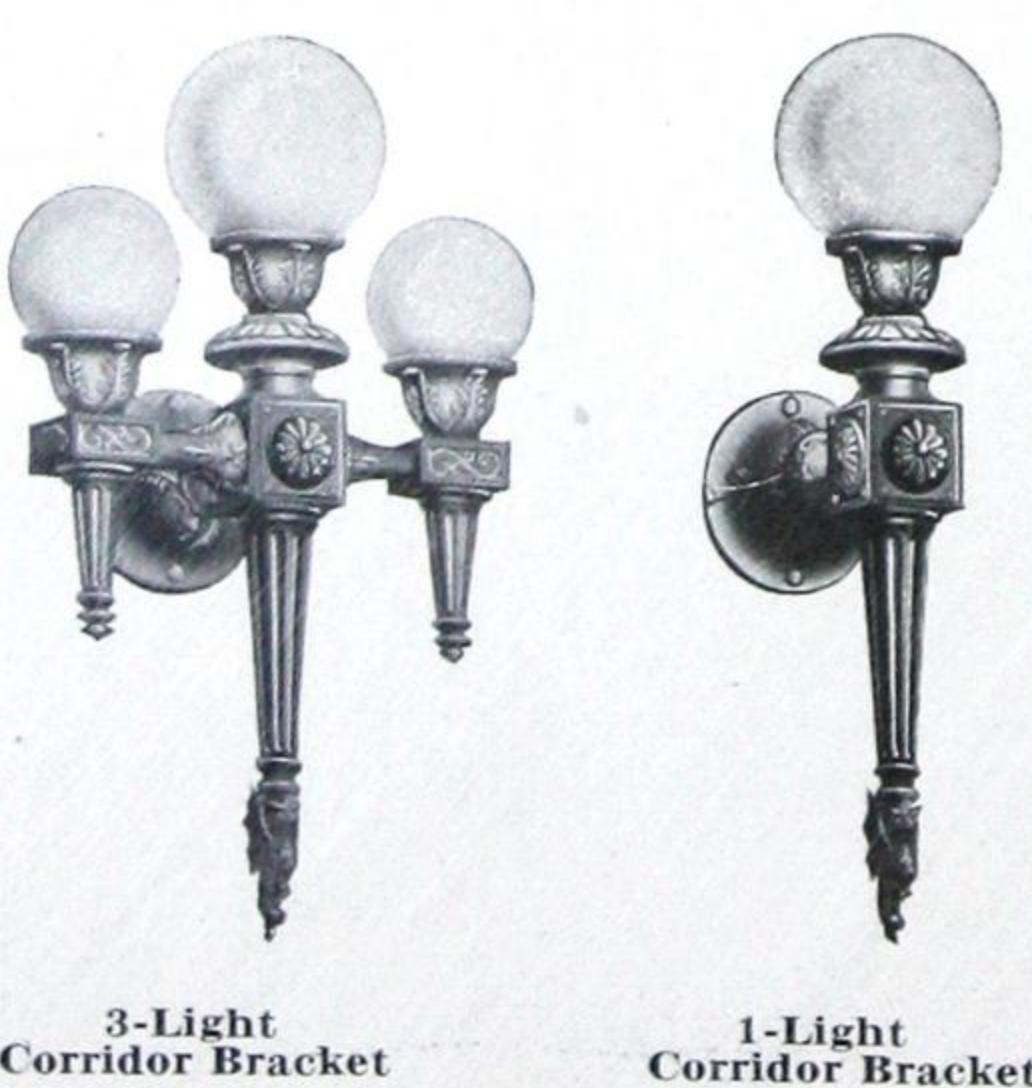
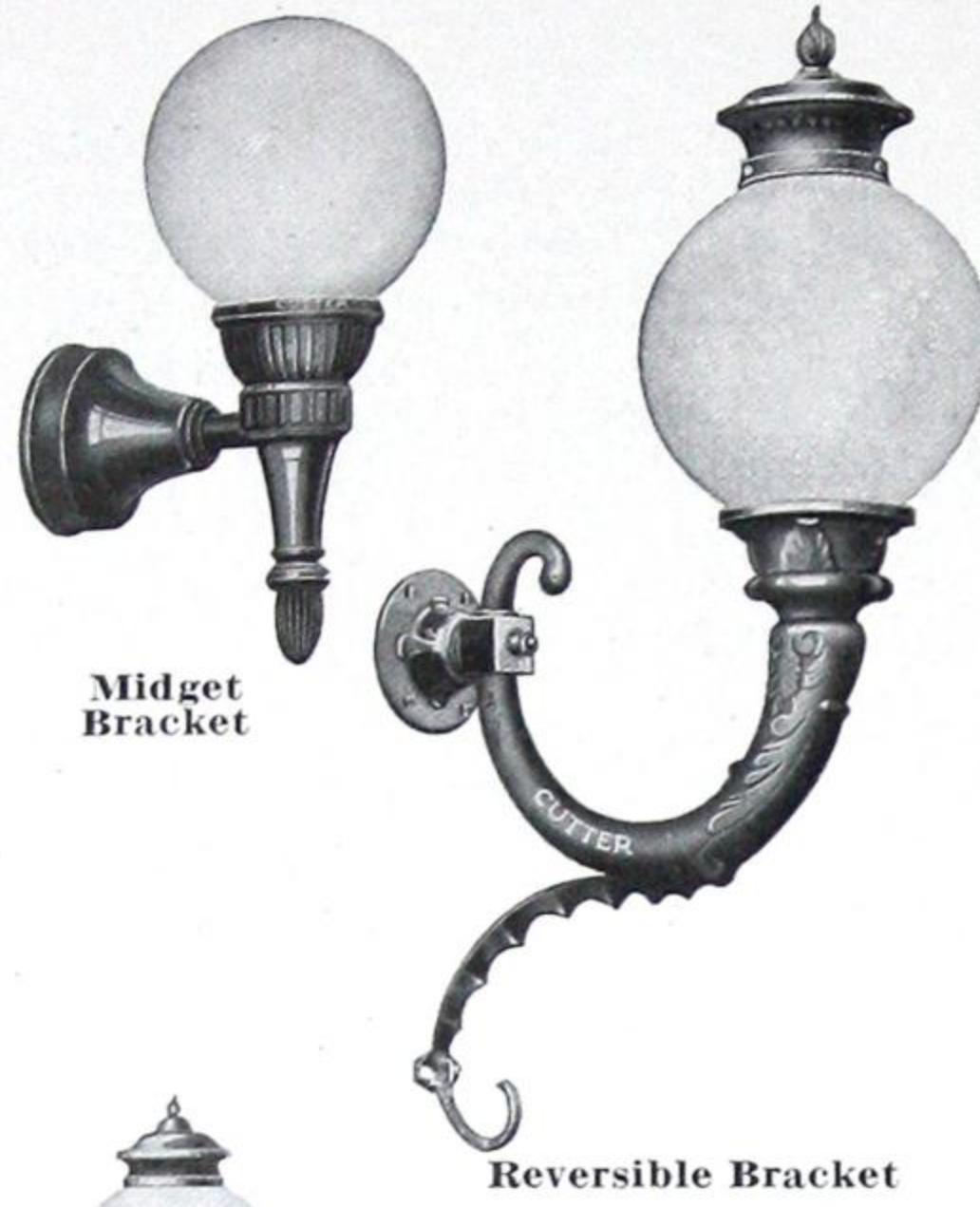
## COMMERCE NEWELS

A massive newel designed especially for bridges and entrances to large buildings, etc. Base, 21x35¼ inches. Height from ground to bottom of pendent globes, 4 feet 6 inches; to top of eagle ornamentation on top globe, 9 feet 6 inches; to top of eagle ornamentation on one-light newel, 8 feet. Pendent globes, 8x14 inches; top globe, 8x20 inches; globe for 1-light newel 8x20 inches. Prices below include medium screw base sockets, glassware as above specified and eagle ornamentation, but not foundation bolts. Use four 7/8-inch foundation bolts.

22561	One-light.....	475	125.00
22563	Three-light.....	550	135.00
22565	Five-light.....	625	150.00

## CUTTER ORNAMENTAL BRACKETS

Schedule I—Standard Package Quantity, 20 of One Style



## MIDGET BRACKETS

A light cast iron bracket designed for small sizes of lamps which do not require ventilation. Has a threaded stem for attachment to crowfoot or conduit. Diameter of wall canopy,  $5\frac{1}{4}$  inches. Distance from end of stem to center of globe, 6 inches. Equipped with  $4\frac{1}{2}$ -inch holder and medium screw socket, but not wired.

Trade No.	Description	Wt. Lbs. Each	Price Each
21835	With 4x8-inch Diffusing Globe	12	\$4.75
21836	Without globe.....	7	3.25

## REVERSIBLE BRACKETS

When ventilation is not necessary, this bracket may have the globe hang downward. In this position, the bracket has the same artistic lines and correct proportions as in the position illustrated. Distance from wall to center of globe, 2 feet. Distance between centers of wall plates, approximately 20 inches. Fitted with 8-inch globe holder.

Prices do not include globe, ventilator or wiring.			
21248	Medium screw socket.....	65	15.00
21837	Mogul Screw Socket.....	65	15.30
21791	8x16-inch Diffusing Ball (with 6-inch top fitter).....	19	6.50
21792	Ventilator, with 6-inch fitter...	9	4.00

## COMMERCE BRACKETS

A massive fixture of distinctly artistic and classical design. Particularly adapted for lighting fronts of fine structures, such as banks and office buildings, clubs, libraries, etc.

Wall plate, 9 inches wide, 20 inches high. Distance from wall to center of top globe, 14 inches. Height to bottom of globe of 1-light bracket, 33 inches; to bottom of center globe of 3 and 4-light brackets, 41 inches. Distance from center to center of opposite globe, 30 inches.

For side lamps use 6x9-inch or 6x10 inch globes. For center lamps use 6x12-inch or 6x14-inch globes.

Prices below do not include lamps, globes, ventilators or wiring. Medium screw sockets are furnished for side lamps, Mogul Screw Sockets for center lamps, unless otherwise specified.

21838	1-light.....	90	20.00
21839	3-light.....	145	30.00
21840	4-light.....	155	32.50
21830	6x 9-inch Diffusing Ball.....	6	1.75
21842	6x10-inch Diffusing Ball.....	7	2.00
21831	6x12-inch Diffusing Ball (without top fitter).....	8	2.50
22476	6x12-inch Diffusing Ball (with 6-inch top fitter).....	8	2.50
22480	6x14-inch Diffusing Ball (with 6-inch top fitter).....	9	3.50
21792	6-inch ventilator.....	9	4.00

## CORRIDOR BRACKETS

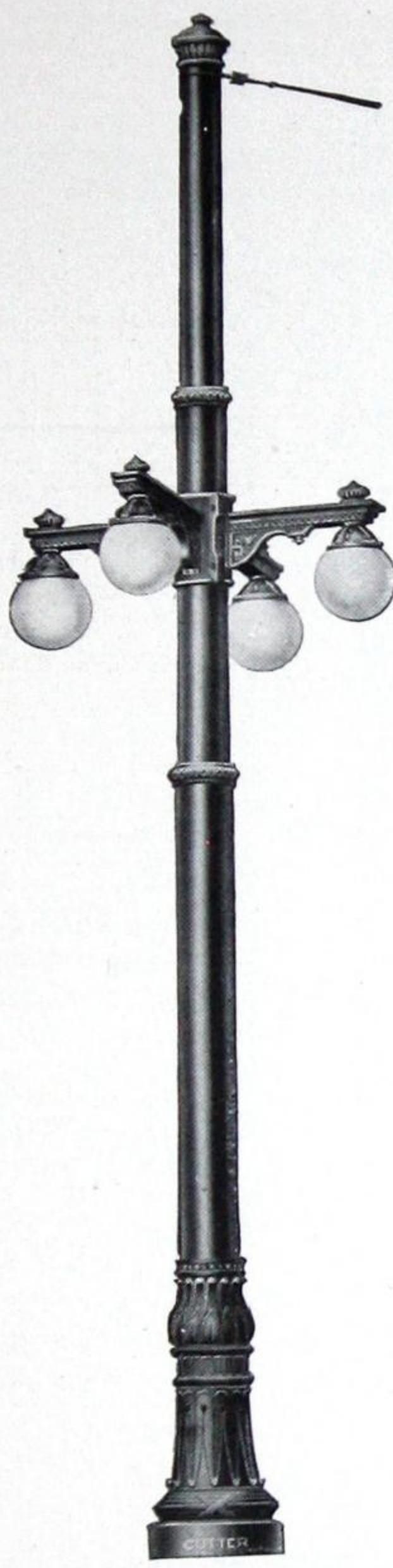
Distance from wall to center of globe of the 1-light bracket, 10 inches. Distance from center to center of opposite globes of the 3-light bracket, 16 inches. Height over all, 40 inches. Globe holders have 6-inch fitters for 6x8-inch side globes and 6x10-inch center globes.

Prices below include globe holders and medium screw sockets, but not the globes or wiring.

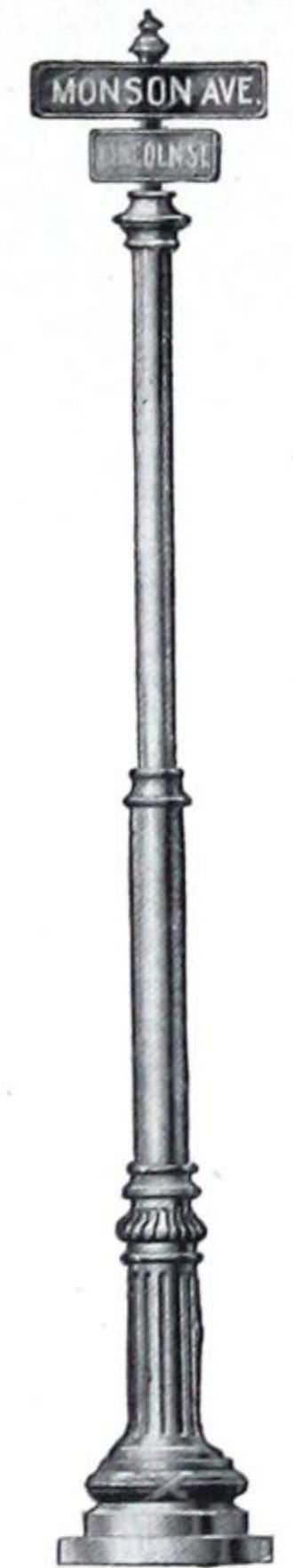
21245	1-light.....	65	15.00
21246	3-light.....	110	21.00
21247	4-light.....	135	24.00
21841	6x8-inch Diffusing Ball.....	5	1.50
21842	6x10-inch Diffusing Ball.....	7	2.00

## CUTTER ORNAMENTAL POSTS AND BRACKETS

Schedule I—Standard Package Quantity, 20 of One Style  
TROLLEY BRACKETS AND SIGN POSTS



Cluster Trolley  
Brackets, No. 22154



Arcade Sign Post  
No. 22443



Sol-lux Trolley  
Brackets, No. 22251

Trolley Brackets

Cluster Trolley Brackets are fitted with 8-inch pendent globe holders and medium screw sockets. The clamps are adjustable to compensate for rake on trolley poles. Distance from center to center of opposite globes, 48 inches. Prices cover brackets only without globes.

Sol-lux Trolley Brackets are designed for Sol-lux Ornamental Tops or Inverted Arc Lamps. Distance from pole to center of lamp, 3 feet. Prices cover brackets only and do not include Arc Lamps or Ornamental Casing, Globe or Ventilator.

For 5-in. Pipe	Trade No. 22152	For 6-in. Pipe 22162	For 7-in. Pipe 22172	Description	Wt., Lbs. Each	Price Each
22154	22164	22164	22174	4-light cluster bracket.....	185	\$25.00
22551	22561	22561	22571	*1-light Sol-lux Bracket for Sol-lux Ornamental Top.....	275	37.50
22552	22562	22562	22572	*Same, for Westinghouse Flame Lamp	265	37.50
22553	22563	22563	22573	*Same, for G-E Novalux Fixture....	265	37.50

\*Prices of 2-light Sol-lux Brackets are double those for single-light brackets.

Sign Posts

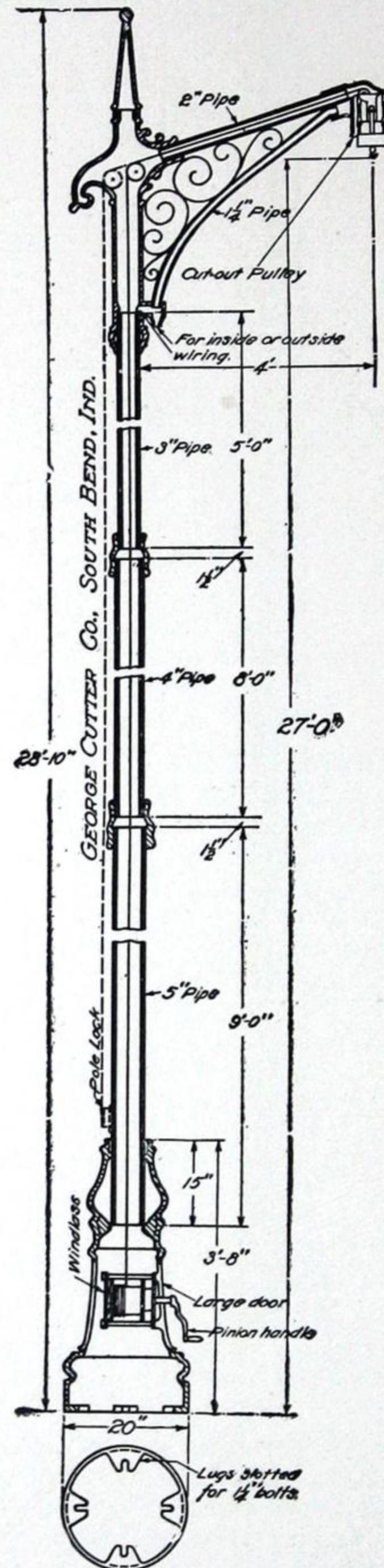
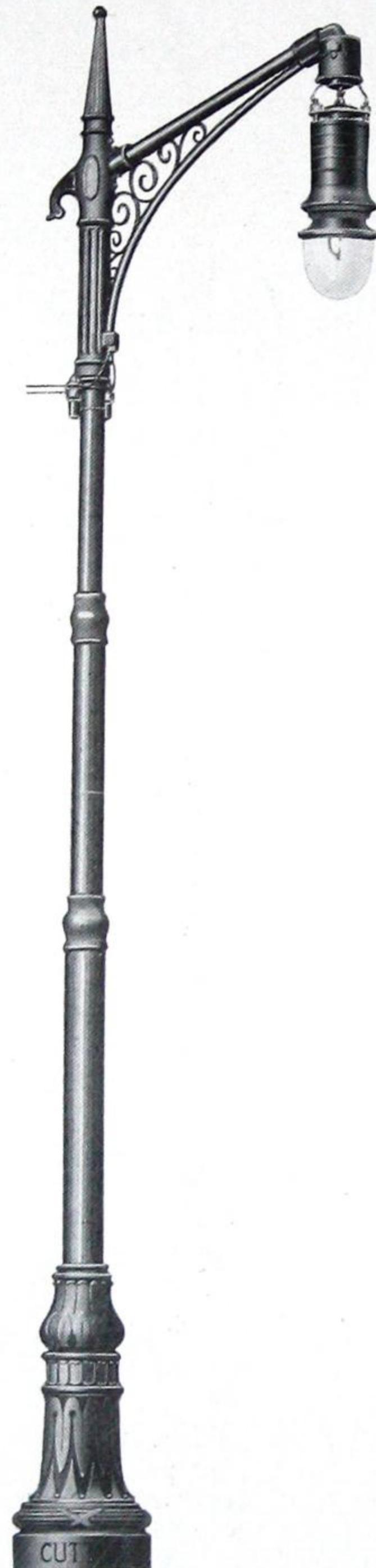
The Arcade Sign Post has a cast iron base, 12 inches in diameter,  $2\frac{1}{2}$  feet high and a column made of  $2\frac{1}{2}$  and  $1\frac{1}{4}$ -inch bore pipe. Height to center of signs, 9 feet 9 inches.

Trade No. 22443	Description Without signs. Use four $\frac{3}{4}$ -inch foundation bolts....	Wt., Lbs. Each	Price, Each \$12.00
	Prices of sign posts will be given upon receipt of specifications.	125	

## CUTTER ORNAMENTAL POSTS

Schedule I—Standard Package Quantity, 20 of One Style

## FLAMING ARC



A substantial and artistic pole for supporting modern arc lamps. The hoisting rope may be run inside or outside the column and the wires may be strung overhead or laid underground.

**Trade No.**  
With Multiple Cut-out Pulley      With Series Cut-out Pulley

		Description	Wt., Lbs. Each	Price Each
21147	21148	With pole lock outside.....	765	\$92.00
21111	21112	With hook in base.....	765	90.50

## With High Voltage Insulator in Place of Cut-out Pulley and without Pole Lock or Hook

21288	With clamp arm for overhead wiring.....	745	82.00
21289	Without clamp arm.....	742	81.20

Prices do not include rope, wiring or foundation bolts. Use four 1 1/4-inch bolts.

## CUTTER ORNAMENTAL POSTS

Schedule I—Standard Package Quantity, 20 of One Style  
STREET CROOKS AND VILLAGE CROOKS



No. 21191

No. 21195

No. 21180

## STREET CROOKS

These are well built street lighting poles for supporting arc or incandescent lamps. Height from ground to insulator, 18 feet. Other heights built to order. Diameter of base, 14 inches. Prices below include 5-foot ground section and insulators for arc lamps or 8-inch globe holders with medium screw sockets for 8x12-inch globes. If ground section is not wanted, deduct \$11.50.

Trade No.					Trade No.						
With Insulator	With Holder	With 8-inch Holder	No. of Lights	Wt., Lbs. Each	Price Each	With Insulator	With Holder	With 8-inch Holder	No. of Lights	Wt., Lbs. Each	Price Each
21180	21184	21186	1	460	\$48.50	21182	21186	21187	3	510	\$58.50
21181	21185	21187	2	485	53.50	21183	21187	21188	4	535	63.00

## VILLAGE CROOKS

Similar to Cutter Street Crooks, but built for overhead wiring. Furnished complete, with clamp arm, ground section and with insulators for arc lamps or 8-inch globe holders and medium screw sockets for 8x12-inch globes. For ladder rest, add \$0.80 to the list prices.

21190	21194	21196	1	485	55.00	21192	21196	3	535	65.00
21191	21195	21197	2	510	60.00	21193	21197	4	560	70.00

Prices do not include glassware, lamps or wiring. Use four  $\frac{3}{8}$ -inch foundation bolts.

## CUTTER ORNAMENTAL POSTS

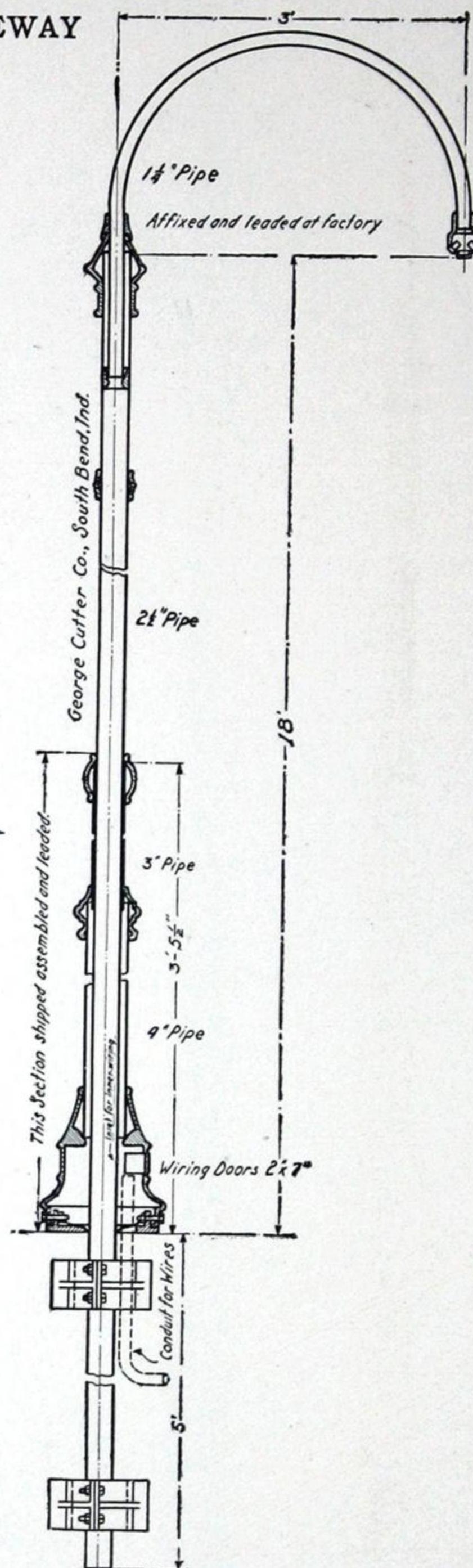
Schedule I—Standard Package Quantity, 20 of One Style

PARK CROOKS AND DRIVEWAY  
CROOKS

Park Crook

Driveway Crook

Park Crook With Hoods



Dimension Diagram Park Crook

Park Crooks are light but substantial poles for supporting arc or incandescent lamps. Standard height from ground to insulator, 18 feet. Other heights built to order. On 14-foot and shorter heights, 4-foot ground sections will be supplied; on greater heights, 5-foot. If ground section is not wanted, deduct \$7.50 from list and use four  $\frac{3}{4}$ -inch foundation bolts.

## TRADE NUMBER

With Insulator	With 18-in. Hoods	No. of Lights	Wt. Lbs. Each	Price Each
21198	21202	1	340	\$37.50
21199	21203	2	365	43.50

## TRADE NUMBER

With Insulator	With 18-in. Hoods	No. of Lights	Wt., Lbs. Each	Price Each
21200	21204	3	385	\$48.50
21201	21205	4	410	53.50

Driveway Crook, a variation of the Park Crook, built 14 feet from ground to lamp, fitted with 4-foot ground section, clamp carb for overhead wires and 20-inch Flat Radial Street-hood Body with Insulating Joint.

Trade No.	Style Socket	Wt., Lbs. Each	Price Each	Trade No.	Style Socket	Wt., Lbs. Each	Price Each
21206	Medium Screw	350	\$40.00	21208	Film	350	\$41.30
21207	Mogul Screw	350	40.30	21209	Without socket	350	39.50

This fixture built for underground wiring at a reduction of \$0.80 from list.  
Prices do not include lamps or wiring. Use four  $\frac{3}{4}$ -inch foundation bolts.

## CUTTER ORNAMENTAL POSTS

Schedule I—Standard package quantity, 20 of one style  
INTERURBAN AND URBAN CROOKS AND SWAN NECKS



Interurban Crook

Urban Crook

Interurban Swan Neck

The column is made of 4-inch and 2½-inch pipe, with the 4-inch pipe extending 4 feet into the ground. The cast iron base has a door to make wiring easy. The crook is made of 1¼-inch pipe and holds the lamp 2 feet, 3 inches from the column. The height to insulator is 14 feet. Prices below include high voltage insulator, or 8-inch globe holder and medium screw socket or 18-inch hood reflector and medium screw socket. If scroll is not wanted, deduct \$2.00 from list. For ground anchors, add \$5.50 to list.

## INTERURBAN CROOKS AND SWAN NECKS

TRADE NUMBER			Description	Wt., Lbs. Each	Price Each
With Insulator	With Globe Holder	With 17-inch Hood			
21218	21220	21222	Crook Bend	225	\$29.60
21219	21221	21223	Swan Neck	225	29.60

## URBAN CROOKS AND SWAN NECKS

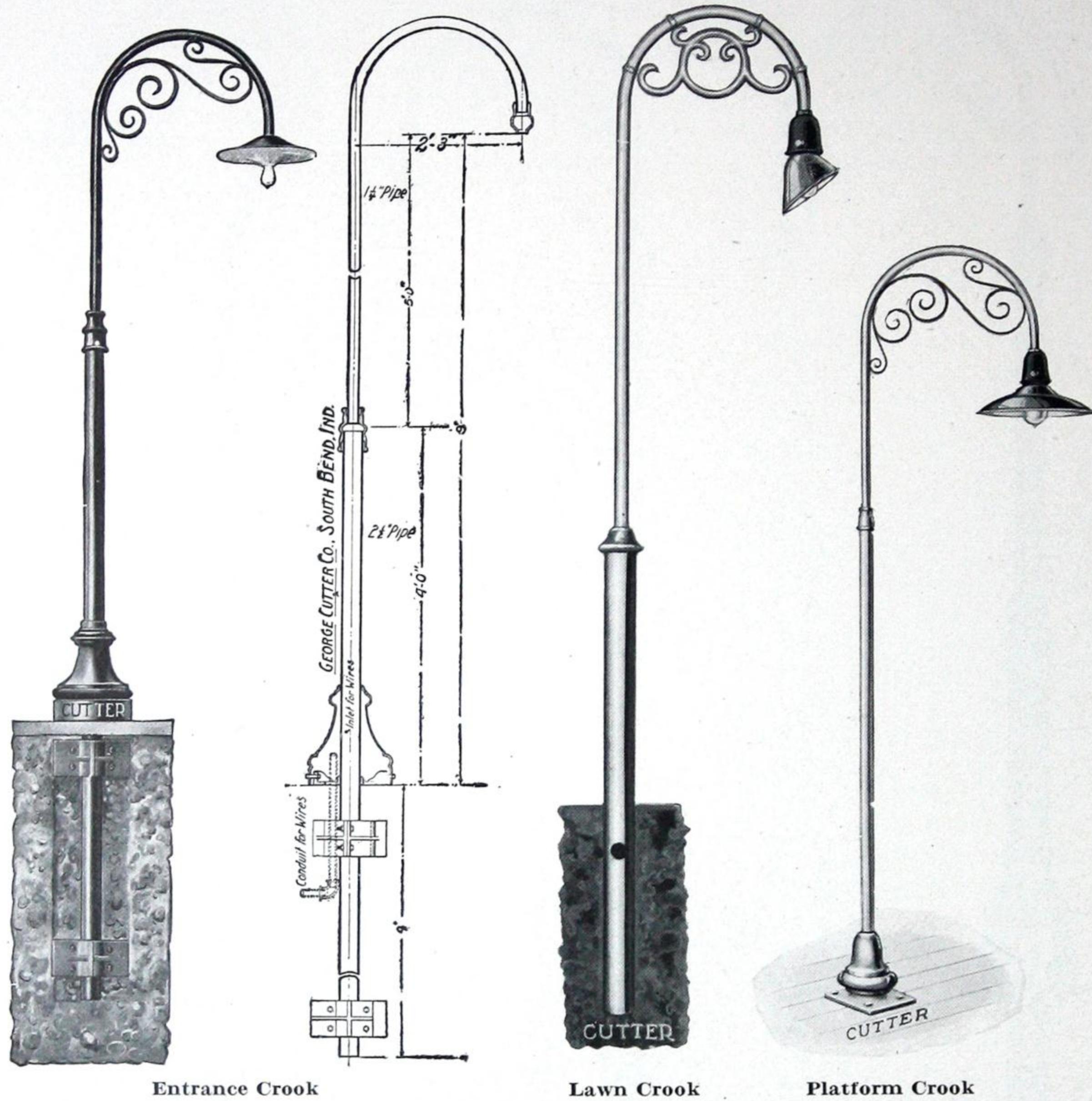
Same as Interurban, but without the base casting.

21224	21226	21228	Crook Bend	190	\$22.60
21225	21227	21229	Swan Neck	190	22.60

Prices do not include lamps or wiring.

## CUTTER ORNAMENTAL POSTS

Schedule I—Standard Package Quantity, 20 of One Style  
ENTRANCE, LAWN AND PLATFORM CROOKS



Entrance Crook

Lawn Crook

Platform Crook

## ENTRANCE CROOKS

Artistic fixtures for lighting entrances to parks, private grounds, etc. The 2½-inch pipe extends 4 feet into the ground. Ground anchors are \$5.00 extra; shipping weight 37 pounds extra. If scroll is not wanted, deduct \$2.00 from list.

Trade No.	Description	Wt. Lbs. Each	Price Each
23775	With 18-inch inverted cone hood, medium screw socket.....	160	\$18.75
23776	With 18-inch radial bowl streethood body, medium screw socket.....	168	22.55
23777	Same, with 20-inch flat radial streethood body.....	167	21.80

## LAWN CROOKS

Similar to entrance crooks, but without cast iron base. If scroll is not wanted, deduct \$1.50 from list. Holds the lamp 2 feet from the column. Outer end is fitted with 1¼x1½-inch reducer and ½-inch nipple with 2¼ or 3¼-inch weatherproof holder to take reflectors having 2¼ or 3¼-inch standard heels. Furnished with other sizes of holders and fittings, when so ordered, at regular catalogue list additions. Prices do not include reflectors. See Schedule H.

23778	With 2¼-inch holder, medium screw socket.....	105	14.85
23779	With 3¼-inch holder, Mogul Screw Socket.....	107	15.35

## PLATFORM CROOKS

A 1¼-inch pipe with cast iron base and crook bend of ½-inch pipe holds the lamp 8 feet from the floor. If scroll is not wanted, deduct \$1.50 from list. Prices do not include reflectors. See Schedule H.

23780	With 2¼-inch holder, medium screw socket.....	80	8.85
23781	With 3¼-inch holder, Mogul Screw Socket.....	82	9.35

Prices do not include lamps or wiring.

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CCA

## WESTINGHOUSE AGENT-JOBBERS

JULIUS ANDRAE & SONS CO., Milwaukee, Wisconsin  
 THE AVERY & LOEB ELECTRIC COMPANY, Columbus, Ohio  
 CARROLL ELECTRIC COMPANY, Washington, D. C.  
 COLUMBIAN ELECTRICAL COMPANY, St. Joseph, Mo.  
 COMMERCIAL ELECTRIC SUPPLY CO., Detroit, Mich.  
 ELECTRIC Rwy. & MFGRS. SUPPLY CO., San Francisco, Cal.  
 FOBES SUPPLY COMPANY, Portland, Ore.  
 FOBES SUPPLY COMPANY, Seattle, Washington  
 ILLINOIS ELECTRIC COMPANY, Chicago, Ill.  
 ILLINOIS ELECTRIC COMPANY, Los Angeles, Cal.  
 INTERMOUNTAIN ELECTRIC COMPANY, Salt Lake City, Utah  
 THE JOHNSON ELECTRIC SUPPLY CO., Cincinnati, Ohio.  
 LEE ELECTRIC COMPANY, Baltimore, Md.  
 THE McGRAW COMPANY, Sioux City, Iowa  
 THE McGRAW COMPANY, Omaha, Nebr.  
 THE MONTANA ELECTRIC COMPANY, Butte, Montana  
 NORTHWESTERN ELECTRIC EQUIPMENT CO., New York, N. Y.

PEERLESS ELECTRICAL COMPANY, Minneapolis, Minn.  
 PENN ELECTRICAL ENGINEERING CO., Scranton, Pennsylvania  
 W. M. REAV & COMPANY, Norfolk, Virginia  
 H. C. ROBERTS ELECTRIC SUPPLY CO., Philadelphia, Pa.  
 H. C. ROBERTS ELECTRIC SUPPLY COMPANY, Syracuse, N. Y.  
 ROCHESTER ELECTRICAL SUPPLY COMPANY, Rochester, N. Y.  
 SATTERLEE ELECTRIC COMPANY, Kansas City, Mo.  
 STUART-HOWLAND COMPANY, Boston, Massachusetts  
 SUPERIOR SUPPLY COMPANY, Bluefield, West Virginia  
 H. C. TAFEL ELECTRIC CO., INC., Louisville, Ky.  
 TEL-ELECTRIC COMPANY, Houston, Texas  
 TOWER-BINFORD ELECTRIC & MFG. COMPANY, Richmond, Va.  
 UNITED ELECTRIC COMPANY, Wichita, Kansas  
 THE VARNEY ELECTRICAL SUPPLY CO., Evansville, Ind.  
 THE VARNEY ELECTRICAL SUPPLY CO., Indianapolis, Indiana  
 THE WASHINGTON ELECTRIC SUPPLY CO., Spokane, Washington

## WESTINGHOUSE DISTRICT OFFICES

ATLANTA, GA., Candler Bldg., 127 Peachtree Street  
 BALTIMORE, MD., Westinghouse Bldg., 121 E. Baltimore Street  
 BIRMINGHAM, ALA., Brown-Marx Bldg., First Ave. and 20th Street.  
 BLUEFIELD, W. VA., Kelley-Moyer Bldg., Raleigh and Higginbotham Avenue  
 BOSTON, MASS., Rice Building, 10 High Street.  
 BUFFALO, N. Y., Ellicott Square Bldg., Ellicott Square  
 BUTTE, MONT., Montana Electric Co. Bldg., 50-52 East Broadway  
 CHARLESTON, W. VA., Union Trust Bldg.  
 CHARLOTTE, N. C., Commercial Bank Bldg., Cor. Tryon and Fourth Street  
 CHATTANOOGA, TENN., Hamilton National Bank Building.  
 CHICAGO, ILL., Conway Bldg., 111 W. Washington Street  
 CINCINNATI, O., Traction Bldg., 5th and Walnut Street  
 CLEVELAND, O., Swetland Bldg., 1010 Euclid Ave.  
 COLUMBUS, O., Interurban Terminal Bldg., 3rd and Rich St.  
 \*DALLAS, TEX., Cotton Exchange Bldg., Akard and Wood Street  
 DAYTON, O., Riebold Bldg., Main Street  
 DENVER, COL., Gas and Electric Bldg., 910 15th Street  
 DES MOINES, IOWA, Fleming Building, 216½ 6th Avenue  
 DETROIT, MICH., Dime Savings Bank Bldg., Fort and Griswold Streets  
 DULUTH, MINN., Providence Building, 332-334 West Superior Street  
 \*EL PASO, TEX., Mills Bldg., Oregon and Mills Street  
 INDIANAPOLIS, IND., Traction Terminal Bldg., Illinois and Market Streets

JOPLIN, MO., BaSom Bldg., 418 Joplin Street  
 KANSAS CITY, MO., Orear-Leslie Bldg., 1012 Baltimore Ave.  
 LOUISVILLE, KY., Paul Jones Bldg., 312 4th Ave.  
 LOS ANGELES, CAL., I. N. Van Nuys Bldg., 7th and Spring Street  
 MEMPHIS, TENN., Exchange Bldg., 6 N. 2nd Street.  
 MILWAUKEE, WIS., First National Bank Bldg., 425 E. Water Street  
 MINNEAPOLIS, MINN., Met. Life Insurance Bldg., 119-131 S. 3rd Street  
 NEW ORLEANS, LA., Maison Blanche Bldg., 921 Canal Street  
 NEW YORK, N. Y., City Investing Bldg., 165 Broadway  
 PHILADELPHIA, PA., Widener Bldg., 1325-1329 Chestnut Street  
 PITTSBURGH, PA., Union Bank Bldg., 306 Wood Street  
 PORTLAND, ORE., Northwestern Bank Bldg., Broadway and Morrison Streets  
 ROCHESTER, N. Y., Chamber of Commerce Bldg., 119 E. Main Street  
 ST. LOUIS, MO., 300 N. Broadway  
 SALT LAKE CITY, UTAH, Walker Bank Bldg., 2nd, South and Main Streets  
 SAN FRANCISCO, CAL., First National Bank Building, 1 Montgomery Street  
 SEATTLE, WASH., Alaska Bldg., 2nd and Cherry Street  
 SYRACUSE, N. Y., University Bldg., 120 Vanderbilt Square  
 TOLEDO, O., Ohio Bldg., Madison Ave. and Superior Street  
 WASHINGTON, D. C., Hibbs Bldg., 723 15th Street N. W.  
 WILKES-BARRE, PA., Miner's Bank Building.

## SERVICE DEPARTMENT REPAIR SHOPS

ATLANTA, GA. . . . . Cor. Mangum and Markham Street  
 BOSTON, MASS. . . . . 37 Wormwood Street  
 BUFFALO, N. Y. . . . . 6 and 8 Lock Street  
 CHICAGO, ILL. . . . . 32 So. Peoria Street  
 LOS ANGELES, CAL. . . . . 2026 Bay Street

NEW YORK, N. Y. . . . . 512 West 23rd Street  
 PHILADELPHIA, PA. . . . . 214-220 North 22nd Street  
 PITTSBURGH, PA. . . . . Amberson Ave. and P. R. R.  
 SAN FRANCISCO, CAL. . . . . 1400 Fourth Street  
 SEATTLE, WASH. . . . . 560 First Avenue, South

\*W. E. & M. Co. of Texas.